

Aerial Survey Geographic Information System Handbook

Sketchmaps to Digital Geographic Information

June 2003

Forest Health Monitoring
Program



State and Private Forestry
Forest Health Protection



Revision History

October 1999	First publication
January 2001	<p>Figure 2 – ARC/INFO PAT File Format – Flown/Not Flown Area Coverages</p> <p><u>Corrected</u> data type in fields BEGIN_DATE1, BEGIN_DATE2, BEGIN_DATE3, END_DATE1, END_DATE2, and END_DATE3 to read D (date) rather than I (integer).</p>
	<p>Appendix D – Cooperating Agency Codes</p> <p><u>Changed</u> MODNR – Missouri Department of Natural Resources to MODC – Missouri Department of Conservation</p>
	<p>Appendix E – Damage Causal Agent Codes</p> <p><u>Add</u> 21028, sudden oak death, <i>Phytophthora spp.</i></p> <p><u>Add</u> 22074, cedar brown pocket rot, <i>Poria sericeomollis</i></p> <p><u>Add</u> 22075, Lachnellula canker, <i>Lachnellula flavovirons</i></p> <p><u>Add</u> 25074, Delphinella shoot blight, <i>Delphinella abietis</i></p> <p><u>Add</u> 80003, five-needle pine decline</p>
June 2003	<p>Figure 1 – ARC/INFO PAT File Format – Damage Coverages and Appendix A - Definitions of Items in Damage Coverages</p> <p><u>Add</u> RPT_YR attribute item with a definition of 4, 4, I</p> <p><u>Changed</u> item definition of SURVEY_ID1, SURVEY_ID2 and SURVEY_ID3 to 6, 6, C from 2, 2, I</p> <p>Figure 2 – ARC/INFO PAT File Format – Flown/Not Flown Area Coverages and Appendix B - Definitions of Items in Flown/Not Flown Coverages</p> <p><u>Add</u> RPT_YR attribute item with a definition of 4, 4, I</p>

Changed item definition of SURVEY_ID1,
SURVEY_ID2 and SURVEY_ID3 to 6, 6, C from 2,
2, I

Changed item name for begin flight date to BEGIN1,
BEGIN2, BEGIN3 from BEGIN_DATE1,
BEGIN_DATE2, BEGIN_DATE3

Changed item name for ending date of flight to END1,
END2, END3 from END_DATE1, END_DATE2,
END_DATE3

Changed item name for number of flight days to
FL_DAYS1, FL_DAYS2 and FL_DAYS3 from
FLIGHT_DAYS1, FLIGHT_DAYS2,
FLIGHT_DAYS3.

Changed item name for comments to FL_NOTES from
FLIGHT_NOTES.

Appendix D – Cooperating Agency Codes

Add AZFH, Arizona Forest Health Program, University
of Arizona

Add NDCNR, Nevada Department of Conservation

Appendix E – Damage Causal Agent Codes

Add 11055, spruce ips, *Ips pilifrons*

Add 11056, Mexican pine beetle, *Dendroctonus mexicanus*

Add 11999, western bark beetle complex

Change 12154, **unknown**, *Thyridopteryx ephemeraeformis*
to 12154, **bagworm**, *Thyridopteryx ephemeraeformis*

Change 12171, **unknown**, *Neodiprion edulicolus* to **pinon**
sawfly, *Neodiprion edulicolus*

Add 12188, elm sawfly, *Cimbrex americana*

Add 12189, june beetle, *Phyllophaga* spp.

Add 12190, hickory tussock moth, *Halisidota caryae*

Add 12191, pin oak sawfly, *Caliroa lineata*

Add 12192, palmerworm, *Dichomeris ligulella*

Add 12193, pitch pine looper, *Lambdina athasaria*
pellucidaria

Add 12194, red pine sawfly, *Neodiprion nanulus nanulus*

Add 12195, pine tip moth, *Argyrotaenia pinatubana*

Add 12196, baldcypress leafroller, *Archips goyerana*

- Add 13030, adana tip moth, *Rhyacionia adana*
Add 14068, European elm scale, *Gossyparia spuria*
Add 14069, elm scurfy scale, *Chionaspis americana*
Change 15058, **unknown**, *Prionoxystus robiniae* to
carpenterworm, *Prionoxystus robiniae*
Add 15083, cottonwood twig borer, *Gypsonoma haimbachiana*
Add 15084, southern pine sawyer, *Monochamus titillator*
Add 15085, banded ash borer, *Neoclytus capraea*
Add 15086, emerald ash borer, *Agrilus planipennis*
Add 16049, prairie tent caterpillar, *Malacosoma lutescens*
Add 16050, jack pine tip beetle, *Conophthorus banksianae*
Add 17021, jumping oak gall wasp, *Neuroterus saltatorius*
Change 21028, sudden oak death, *Phytophthora* spp. to
Phytophthora ramorum
Add 22076, strumella canker, *Strumella coryneoidea*
Add 22077, phomopsis blight, *Phomopsis juniperovora*
Add 22078, fusarium canker of yellow poplar, *Fusarium solani*
Add 22079, sterile conk of maple and beech, *Inonotus glomeratus*
Add 22080, canker of spruce, *Aleurodiscus* spp.
Add 22081, birch conk, *Piptoporus betulinus*
Add 22082, canker, *Discocainia treleasei*
Add 24030, elm phloem necrosis, *Mycoplasma*
Add 26013, southern cone rust, *Cronartium strobilinum*
Add 80004, pinion pine mortality

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Introduction

The purpose of this handbook is to guide the process of incorporating geographic information systems (GIS) into insect and disease aerial survey data storage, reporting, and analysis. The handbook discusses compiling and entering aerial survey sketchmaps into GIS, quality assurance/quality control (QA/QC) issues, and presents the GIS database standards, format, and coding schemes required for entering data into the national Forest Health Monitoring database.

It should be emphasized that a successful aerial survey program is a team effort involving, not only the sketchmappers, pilots, and ground support personnel, but also the people involved in compiling, digitizing, and moving the data into a digital database. Prior to the start of the aerial survey season, GIS personnel should meet with the aerial survey specialists and assist in the development of the aerial survey plan. GIS requirements for map types, coding schemes, definitions, and other data requirements should be identified before the survey is flown. It is hoped this document provides the link between the aerial survey, the Forest Health Monitoring Aerial Survey Standards and the national database, and identifies key GIS considerations that should be incorporated into the aerial survey. The use of GIS should streamline the process of getting the aerial survey sketchmap information into the hands of those who need and use it. These people range from program managers at the national level to land managers and field personnel.

The development of the handbook will be an ongoing process. As technology, policies, fieldwork procedures, aerial survey methods, and Forest Health Monitoring Standards change, the handbook will be revised. The Aerial Survey Standards Working Group hopes this handbook will be a useful reference for the people working with aerial survey data in GIS.

Getting Sketchmaps Ready for GIS

The goal is to use a map for aerial sketchmapping that is suitable for use both in the airplane and for digitizing. Choosing the map should be a coordinated effort between the aerial survey and GIS personnel. Compromises may have to be made, but the use of one map for both purposes will result in greater efficiency and eliminate errors that may arise in transferring data between maps of different scales or projections.

The schedule for mapping activities should be coordinated between the sketchmappers and the people doing the GIS work. Prior to the flying season, the aerial survey and GIS personnel should prepare a proposed schedule detailing when sketchmaps will be available for digitizing. The schedule should be realistic and reflect potential problems, such as bad weather that may delay the aerial survey.

Requirements for Sketchmaps

Information on and recommendations for base maps for aerial survey are presented in [A Guide to Conducting Aerial Sketchmapping Surveys](#). The characteristics of the map as they pertain to entering data into GIS are as follows:

- Maps should be at a scale of 1:100,000 or larger (e.g., 1:24,000) for the continental United States. Maps for Alaska may be at a scale of 1:250,000.
- Maps should display a standard projection and coordinate system (e.g., UTM).
- Maps should have a minimum of four points suitable for using as registration points when converting the map to digital form. These points should be tied to the coordinate system on the map.
- The maps should be in good condition. They should be clean and as free from wrinkles and tears as possible. If original survey maps are damaged, the data should be transferred onto a new map suitable for digitizing, though the transfer of data to a new map should be avoided if possible.
- The map should be neat. Features should be drawn using a thin discrete line or point that is clearly visible against the background of the map. Areas should be represented as closed polygons.
- The coding on the map should be clear and complete. Coding should be legible and clearly associated with the correct feature. All features shown should be assigned attributes.
- Adjacent maps should be edge-matched. All lines crossing the edge of the map should match up with the corresponding line on the adjacent map.

- Areas covered by the aerial survey (see the discussion on Flown/Not Flown Areas, later in the guide) should be delineated on the sketchmap(s) or on another map(s) of similar scale. If a separate map is used, it should meet all of the above requirements.

Data Coding

Prior to the beginning of the aerial survey, there should be agreement between the sketchmapping and GIS personnel on the coding scheme to be used on the aerial survey maps. Requirements for coding may be different for different projects or aerial survey missions. Due to the difficulty of recording information on maps during flight, different coding schemes may be needed for recording the data on the sketchmaps from what is used in the GIS database. Coding schemes should take into account the national reporting efforts, and Region or local reporting requirements. There are, at this time, national standards in place for reporting mortality and defoliation that include standard attributes and coding schemes. These coding schemes are presented in the appendices to this guide.

A data dictionary should be developed for use both by the sketchmappers and the GIS personnel. The data dictionary should show each data element required and the characteristics of each element.

The characteristics of a data element are as follows:

- Name of data element
- Description of data element
- Type of data - Integer, decimal number, or alphanumeric character
- Size of field - Number of allowable characters
- Number of decimal places for numeric data
- Allowable codes or entries for alphanumeric data - Allowable values or range for numeric data
- Definitions of codes
- Source or reference for codes
- Crosswalk between codes used on sketchmaps and data entered into GIS. There can be a one to one relationship between map codes and GIS codes or map data may be aggregated into broader categories in GIS.

The data dictionary information will also be used in the metadata for the digital geographic information.

Building Digital Geographic Information

The process of converting hardcopy sketchmaps to digital geographic information involves two steps. The first step is converting the sketchmap data recorded on paper or mylar maps into digital form. The second step is processing the digital data into usable data.

Currently in the Forest Service, digital geographic information is stored as a coverage in ARC/INFO that may be converted into a shape file for use with ArcView. As GIS technology changes, the internal format of digital geographic data will change.

Converting Data

The raw aerial survey data is recorded on paper sketchmaps. The data can be converted into digital form either by scanning maps electronically or by digitizing the the maps manually. GIS personnel should determine the better method to use based on the individual situation.

Scanning the sketchmaps involves feeding a map into a scanner, which creates a digital file containing all features visible on the map. Scanning may require editing and cleaning of the data before and after scanning. In some cases, sketchmapped data may have to be transferred to another medium (such as a mylar sheet) prior to scanning. After scanning, the electronic file may require "cleanup" to resolve unclear lines.

Digitizing sketchmaps involves transferring sketchmapped data to a digital file selectively. The sketchmap is taped to a digitizing table and a digitizing mouse is used to trace sketchmapped polygons. Digitizing is more labor-intensive than scanning, but requires less "cleanup" of the digital file. Both methods should yield the same result: a clean and accurate digital representation of the sketchmap.

The important factors to keep in mind when either scanning or digitizing are as follows:

- The registration points on the sketchmaps should be used when entering the data into GIS to ensure that the data is geographically accurate.
- Map projections of the sketchmaps and of the resulting coverage should be considered to ensure accurate data transformations.
- The accuracy of the data on the sketchmap should be maintained in the conversion process.
- The conversion should be both efficient and cost-effective.
- The final coverage should accurately reflect the data on the sketchmaps, with points and polygons on the two matching up.
- The final coverage should be clean (e.g., polygons should be closed, with no gaps or dangling line segments).

- A polygon coverage of Flown/Not Flown areas should be created and accurately reflect the sketchmaps (coverage may be created by digitizing, scanning, buffering GPS data of flightlines, or other methods).

Data Processing

The coverage created by the data conversion process is merely a set of points and polygons. Further processing is necessary to make the coverage usable. The attributes for each point and polygon must be entered and attached to the appropriate feature. Two or more coverages may have to be combined to create one coverage for a given project. Coverages may have to be projected into appropriate map projections. The end result of the processing should be a clean coverage that meets the units requirements for use of the aerial survey data. The coverages should also be able to be processed for incorporation into the national GIS aerial survey database. The final section of this document contains information on requirements for the national database.

There are numerous methods of entering attributes into GIS and associating them with the appropriate features. The method used should be based on the individual situation. The attributes are stored in the appropriate feature table in ARC/INFO or a table in the Oracle database system. The attributes should be checked back against the sketchmaps to ensure accuracy. This can be accomplished by producing a 'check' map from the GIS showing features with attributes that can be directly compared to the sketchmaps.

If one aerial survey project produces several sketchmaps, the coverages for each map may be combined into one coverage for the project. The coverages to be combined must be in the same map projection. Adjacent maps should have been edgematched prior to converting the maps into digital form. However, additional editing may be necessary. Entering attributes into GIS can be done for each map either before the maps are combined or after they have been combined into a single coverage.

Calculations, such as converting areas (usually expressed in meters) to acres, should be performed at the appropriate time, taking into account the processing steps to be performed. For example, calculating trees-per-acre should be performed with accurate acreage figures for the polygon to which the tree count applies. If a polygon spans two or more map sheets, then the polygon segments should be joined before the trees-per-acre figure is calculated. This would also apply to situations in which the damage polygon may be divided during an overlay process such as overlaying damage polygons with county boundaries. Trees per acre should be calculated for the polygon before it is used in an overlay process. Standard conversion factors should be used throughout a project.

Each unit may have different requirements for using the aerial survey data. In producing maps and reports to meet these requirements, coverages may need to be projected into different map projections. ARC/INFO provides the tools to achieve this.

The current requirements for delivering aerial survey data to the national GIS database are described in the final section of this document. Map projection parameters, coverages, conversion factors, attributes, and other information are discussed. The information about the attributes includes references to standard coding to be used, and the sources of these coding schemes. All data processing should consider the national reporting effort to ensure that aerial survey data can be submitted to the national database with the appropriate attributes and formats.

Processing Additional Coverages

Individual units will have different requirements for additional coverages to go along with the aerial survey data. The only additional coverage required by the national reporting effort is the Flown/Not Flown Areas coverage.

Flight lines are a good example of an additional coverage a unit may require. The flight lines can be used to accurately assess the coverage of an area by the aerial survey. The coverage may even be used to develop the Flown/Not Flown Areas coverage.

Coverages of Forest Inventory and Analysis (FIA) and Forest Health Monitoring (FHM) plot locations may be required to produce maps showing the relationship of the aerial survey data to plot locations. In the future, procedures may be developed to use the aerial survey data to assess data collected on these plots, and vice versa. The plot location data should be used with caution due to the sensitive nature of some locations. Due consideration should be given to the level of accuracy of the aerial survey and plot location before using the data together.

Various coverages or reference data will probably already exist in GIS. These coverages are needed to allow further analysis and produce maps showing the aerial survey data in relationship to traditional map features, such as roads, national forest boundaries, etc.

Documentation and Metadata

Documentation of the data-generation process, from starting with sketchmaps through GIS maps and reports, is important. Documentation allows involved parties to track what was done, how it was done, when it was done, and who did it. The documentation also ensures that anyone using the data knows the limitations of the data and will be able to determine appropriate uses of the data.

Documentation really starts in the planning process for an aerial survey project. Ideally, everyone involved in the project should sit down and design the project from data collection to final information. The documentation should be designed into the project and assigned to the responsible parties to ensure completion.

The main tool for documentation is metadata attached to each coverage. Metadata, or data about data, has all the information needed by someone to allow them to use the data correctly. As of this writing, the Forest Service has not adopted an application for handling metadata. However,

several are being reviewed that are compliant with the Federal Geographic Data Committee (FGDC) standards. Numerous applications exist that are compliant with FGDC. The application used should be determined by the GIS personnel, but it must be FGDC-compliant.

Most of the documentation for aerial survey data will be handled by the metadata effort. However, additional documentation may be required. The documentation should cover the following main items:

- Where the data comes from, including where and when the data was collected.
- The format of the data at the start of the GIS process including a data dictionary.
- The process used to convert the data to digital format and turn it into geographic information.
- The data parameters needed by anyone using the coverages to do further analysis.
- The information needed by anyone using the geographic information to make decisions.

Documentation should be readily available. Metadata should be associated with the appropriate coverage and accompany the coverage when it is shared with, or delivered to, another user.

Quality Assurance/Quality Control

The quality assurance/quality control (QA/QC) process should ensure that the conversion of sketchmap data into digital geographic information maintains the accuracy of the original data.

The conversion of the data into digital form and any other GIS processes performed on the data should be checked to ensure that the process maintains data accuracy. The production of a 'check' map to use as an overlay to the sketchmaps for checking the GIS coverage is one method of doing this. The 'check' map also can be used to compare coding on the sketchmap to the GIS coverage.

The coding of all attributes should be checked against the data dictionary to see that all the data are valid. Macros in GIS can be used to check data validity, as can the use of the 'check' map. Any calculations made in GIS should also be checked against the data dictionary, in addition to confirming that the calculation itself is correct.

Production of maps and reports should be based on the accuracy of the data. Maps should not be produced at a significantly larger scale than that at which the data was collected and compiled. Doing this implies an accuracy of the data that is not supported. Information in reports should be reported in the same accuracy as the original data.

The metadata should accompany the GIS coverage. The accuracy of the data is recorded in the metadata, and should serve as a reminder to anyone using the data as to the accuracy of the data.

Output

The only standard outputs from the aerial survey data are the requirements for FHM reporting and the national reporting efforts. Each individual unit will have its own specific output requirements. These may reflect a need to provide maps to state cooperators, national forest personnel, and private parties.

National GIS Database Requirements

A national GIS database for all aerial survey data has been established at the Forest Health Technology Enterprise Team (FHTET) in Fort Collins, Colorado. The purpose of this database is to provide a single source for all aerially detected insect, disease, and abiotic forest damage data to facilitate national and multi-regional level reporting of damage for both Forest Health Monitoring and Forest Health Protection. At this time, the National Aerial Survey Data Standards require only mortality and defoliation data be collected and reported. Some cooperators are collecting data on other damage type; for this reason, the national database has been configured to include those other damage types. The database will contain both current data and, as available, historic data. It is anticipated that, in the future, this database will be expanded to include insect and disease data collected by other means.

The database is built from ARC/INFO coverages developed by the Regions/Area and made available each year to the staff at FHTET. The following sections describe the format requirements for those coverages.

Coverages

- **Overview Survey** An overview survey is one during which all types of damage are mapped. This, the most common type of survey, normally takes weeks or months to complete, and covers an extensive area. All overview surveys will be delivered as a single polygon coverage for each Region/Area, containing all damage data for that calendar year.
- **Special Surveys** Special surveys are flown to capture data on a single insect, disease or abiotic event, and are usually done at a time when the signature for that event is most apparent. These surveys frequently cover a smaller geographic area than an overview survey, and may infact overlap in area with the overview survey in the same year. Each special survey, or combinationof several special surveys for the same insect or pathogen, will be delivered as a separate coveage in the same format as the overview survey.
- **Flown/Not Flown Area** Each overview and special survey coverage will be accompanied with a coverage delineating the area or areas surveyed. The purpose of this coverage is to allow data users to distinguish areas of no damage from areas for which there is no data.

Standard Conversion Factors

When converting area in meters to acres in the GIS, the following formula should be use:

$$\text{Acres} = \text{Area (in square meters)} / 4046.8726$$

Map Projection Parameters

All data for all coverages should be projected into the Albers Conic Equal Area projection using the following parameters:

Item	Conterminous 48 States	Alaska
Map Units	Meters	Meters
Spheroid	Clarke 1866	Clarke 1866
First Standard Parallel	29 Degrees 30 Minutes	55 Degrees 0 Minutes
Second Standard Parallel	45 Degrees 30 Minutes	65 Degrees 0 Minutes
Central Meridian	-96 Degrees 0 Minutes	-154 Degrees 0 Minutes
Latitude of Projection's Origin	23 Degrees 0 Minutes	50 Degrees 0 Minutes
False Easting (meters)	0.0	0.0
False Northing (meters)	0.0	0.0

Polygon Attribute Table For Damage Coverages

Figure 1 contains the polygon attribute table (PAT) format for aerial survey damage data collected during either overview or special surveys. Appendix A contains descriptions of each data item in the PAT. Example data and an example PAT for damage coverages is contained in Appendix C. The following should be noted about the PAT:

- The standard coding scheme allows for entering up to three aerial survey observations for any one polygon. Each observation is a unique combination of attributes (survey_id1, dmg_type1, severity1, etc.) and is assigned to one of three attribute groups (survey_id1, dmg_type1... survey_id2, dmg_type2... survey_id3, dmg_type3...). Data should not be entered into one attribute in a group unless data is entered in all attributes in the group. (See example PAT file in Appendix C.)

Note: If special circumstances call for more than three attribute groups for any one polygon, these may be added to the PAT based on the standard scheme. (Example: SURVEY_ID4, DMG_TYPE4, SEVERITY4....SURVEY_ID6, DMG_TYPE6, SEVERITY6)

- The coding scheme does not require real data in each field of the PAT. Fields with "No Data" may result from the way data was collected or differences between data required by mortality versus defoliation. (See example PAT file in Appendix C.)
- The coding scheme allows for more than one damage type to be entered for any one polygon. Therefore, acreage summary for all damages may double- or triple-count the area of some polygons. Users should be aware of this, and structure queries so as to avoid it, if desired.
- Acres will be calculated from area using the standard conversion factor shown above.

- The measure of mortality is dead trees per acre (TPA). TPA is entered directly or calculated from the number of trees (the NO_TREES field) divided by acres (the ACRES field). In those cases where trees per acre (TPA) is recorded and entered directly, the number of trees (NO_TREES) field is calculated from TPA multiplied by ACRES.
- Additional items, such as "Reporting Region" and "Survey Year," may be added at the national level during the combining of data from all the Regions/Area.

Figure 1: ARC/INFO PAT File Format - Damage Coverages (Overview and Special Surveys)

Item Name	Input Width	Output Width	Type	No. Dec	Description
AREA	4	12	F	3	Item generated by ARC/INFO
PERIMETER	4	12	F	3	Item generated by ARC/INFO
COVERAGE#	4	5	B		Item generated by ARC/INFO
COVERAGE-ID	4	5	B		Item generated by ARC/INFO
RPT_YR	4	4	I		Year of survey
SURVEY_ID1	6	6	C		Unique Survey Identifier
SURVEY_ID2	6	6	C		Unique Survey Identifier
SURVEY_ID3	6	6	C		Unique Survey Identifier
DMG_TYPE1	2	2	I		Damage Type Code
DMG_TYPE2	2	2	I		Damage Type Code
DMG_TYPE3	2	2	I		Damage Type Code
SEVERITY1	2	2	I		Defoliation Severity Code
SEVERITY2	2	2	I		Defoliation Severity Code
SEVERITY3	2	2	I		Defoliation Severity Code
PATTERN1	2	2	I		Defoliation Pattern Code
PATTERN2	2	2	I		Defoliation Pattern Code
PATTERN3	2	2	I		Defoliation Pattern Code
TPA1	7	7	N	2	Dead Trees Per Acre
TPA2	7	7	N	2	Dead Trees Per Acre
TPA3	7	7	N	2	Dead Trees Per Acre
NO_TREES1	7	7	I		Number of Dead Trees
NO_TREES2	7	7	I		Number of Dead Trees
NO_TREES3	7	7	I		Number of Dead Trees
DCA1	5	5	I		Damage Causal Agent Code
DCA2	5	5	I		Damage Causal Agent Code
DCA3	5	5	I		Damage Causal Agent Code
HOST1	4	4	I		Host Tree Species Code
HOST2	4	4	I		Host Tree Species Code
HOST3	4	4	I		Host Tree Species Code
FOR_TYPE1	4	4	I		Forest Type Code
FOR_TYPE2	4	4	I		Forest Type Code
FOR_TYPE3	4	4	I		Forest Type Code
ACRES	4	12	F	1	Calculated Acres Based on AREA
NOTES	60	60	C		Comments

Polygon Attribute Table For Flown/Not Flown Coverages

Figure 2 contains the polygon attribute table (PAT) for the flown/not flown coverage. The purpose of the coverage is to enable users to differentiate between areas that were surveyed and contained no damage and those areas for which no survey was flown. Each damage coverage should be accompanied by a flown/not flown coverage. As with the PAT for damage coverages, this attribute coding scheme provides for up to three attribute groups per polygon to allow for overlaps, multiple agencies, multiple surveyors, etc. As with the damage coverages, data should not be entered into one attribute in a group unless it is entered into all attributes in a group. The coding scheme does not require real data in each field. Appendix B contains descriptions of each Flown/Not Flown Area data item in the PAT.

Figure 2: ARC/INFO PAT File Format - Flown/Not Flown Area Coverages

Item Name	Input Width	Output Width	Type	No. Dec	Description
AREA	4	12	F	3	Item generated by ARC/INFO
PERIMETER	4	12	F	3	Item generated by ARC/INFO
COVERAGE#	4	5	B		Item generated by ARC/INFO
COVERAGE-ID	4	5	B		Item generated by ARC/INFO
RPT_YR	4	4	I		Year of survey
SURVEY_ID1	6	6	C		Unique Survey Identifier
SURVEY_ID2	6	6	C		Unique Survey Identifier
SURVEY_ID3	6	6	C		Unique Survey Identifier
FLOWN1	2	2	I		Flown/Not Flown Code
FLOWN2	2	2	I		Flown/Not Flown Code
FLOWN3	2	2	I		Flown/Not Flown Code
AGENCY1	10	10	C		Responsible Agency
AGENCY2	10	10	C		Responsible Agency
AGENCY3	10	10	C		Responsible Agency
SURVEYOR1	30	30	C		List of Aerial Surveyors
SURVEYOR2	30	30	C		List of Aerial Surveyors
SURVEYOR3	30	30	C		List of Aerial Surveyors
BEGIN1	8	8	D		Beginning Date of Flight
BEGIN2	8	8	D		Beginning Date of Flight
BEGIN3	8	8	D		Beginning Date of Flight
END1	8	8	D		Ending Date of Flight
END2	8	8	D		Ending Date of Flight
END3	8	8	D		Ending Date of Flight
FL_DAYS1	3	3	I		Number of Days for the Survey
FL_DAYS2	3	3	I		Number of Days for the Survey
FL_DAYS3	3	3	I		Number of Days for the Survey
PURPOSE1	30	30	C		Purpose of the Flight
PURPOSE2	30	30	C		Purpose of the Flight
PURPOSE3	30	30	C		Purpose of the Flight
FL_NOTES	60	60	C		Comments

Appendix A Definitions of Items (Attributes) in Damage Coverages

Attribute label: area perimeter coverage# coverage-id

Definition (description): Items generated by ARC/INFO

Attribute label: survey_id1 survey_id2 survey_id3

Definition (description): Unique identifier for survey project

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No data

User-defined numeric/alphanumeric code

Format Type: Character

Format Length: 6

Attribute label: rpt_yr

Definition (description): Year the survey was flown

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: YYYY four digit year

Format Type: Integer

Format Length: 4

Attribute label: dmg_type1 dmg_type2 dmg_typ3

Definition (description): Damage type identification code

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

1 Defoliation

2 Mortality

3 Discoloration

4 Dieback

5 Topkill

6 Branch Breakage

7 Main Stem Broken/Uprooted

8 Branch Flagging

9 No Damage

10 Other Damage

Format Type: Integer

Format Length: 2

Attribute label: severity1 severity2 severity3

Definition (description): Defoliation severity code

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

1 Low (Equal to or Less than 50 % defoliation)

2 High (More then 50 % defoliation)

Format Type: Integer

Format Length: 2

Attribute label: pattern1 pattern2 pattern3

Definition (description): Defoliation pattern code

Source USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

1 Host type or species is > 50 % and the damage is contiguous
(relatively continuous)

2 Host type or species is > 50 % and damage is patchy (concentrated in
discrete pockets or individual trees)

3 Host type or species < 50 % and damage is continuous

4 Host type or species < 50 % and damage is scattered

Format Type: Integer

Format Length: 2

Attribute label: tpa1 tpa2 tpa3

Definition (description): Dead trees per acre - measure of mortality

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

0 to 9999.99 User-defined

Format Type: Numeric

Format Length: 7

Decimal Places: 2

Attribute label: no_trees1 no_trees2 no_trees3

Definition (description): Number of dead trees detected - measure of mortality

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

0 to 9999999 User-defined

Format Type: Integer

Format Length: 7

Attribute label: dca1 dca2 dca3

Definition (description): Damage-causing agent code

Source: USDA Forest Service, FMSC, "FSVeg - Field Sample Vegetation Data Dictionary"
version 1.3

Domain Value: 99999 No Data

0 to 99999 User-defined

Format Type: Integer

Format Length: 5

Attribute label: host1 host2 host3

Definition (description): Host tree species code

Source: USDA Forest Service, Environmental Monitoring and Assessment Program
(EMAP) FHM Manual (Eastern and Western), Appendix A

Domain Value -1 No Data

0 to 9999 User-defined

Format Type: Integer

Format Length: 4

Attribute label: for_type1 for_type2 for_type3

Definition (description): Forest Type Code

Source: USDA Forest Service, EMAP FHM Manual (Eastern and Western) Appendix C

Domain Value: -1 No Data

0 to 9999 User-defined

Format Type: Integer

Format Length: 4

Attribute label: acres

Definition (description): Area in Acres of the Polygon

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

0 to 999999.9 User-defined

Format Type: Floating Point

Format Length: 12

Decimal Places: 1

Attribute label: notes

Definition (description): Notes (comments)

Format Type: Character

Format Length: 60

Appendix B Definitions of Items (Attributes) in Flown/Not Flown Coverages

Attribute label: area perimeter coverage# coverage-id

Definition (description): Items generated by ARC/INFO

Attribute label: survey_id1 survey_id2 survey_id3

Definition (description): Unique identifier for survey project

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

User-defined numeric or alphanumeric code

Format Type: Character

Format Length: 6

Attribute label: rpt_yr

Definition (description): Year the survey was flown

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: YYYY four digit year

Format Type: Integer

Format Length: 4

Attribute label: flown1 flown2 flown3

Definition (description): Code identifier for areas flown or not flown

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

0 Not Flown

1 Flown

Format Type: Integer

Format Length: 2

Attribute label: agency1 agency2 agency3

Definition (description): Acronym identifier for agency responsible for flight

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook (see List below)

Format Type: Character

Format Length: 10

Attribute label: surveyor1 surveyor2 surveyor3

Definition (description): List of aerial surveyors

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Format Type: Character

Format Length: 30

Attribute label: begin1 begin2 begin3

Definition (description): Beginning date for survey flown

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

YYYYMMDD Date format

Format Type: Date

Format Length: 8

Attribute label: end1 end2 end3

Definition (description): Ending date for survey flown

Source USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

YYYYMMDD Date format

Format Type: Date

Format Length: 8

Attribute label: fl_days1 fl_days2 fl_days3

Definition (description): Number of days from beginning of survey to end of survey

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Domain Value: -1 No Data

1 to 999 User-defined

Format Type: Integer

Format Length: 3

Attribute label: purpose1 purpose2 purpose3

Definition (description): Purpose of aerial survey

Source: USDA Forest Service, FHM Aerial Survey codes, GIS Handbook

Format Type: Character

Format Length: 30

Attribute label: fl_notes

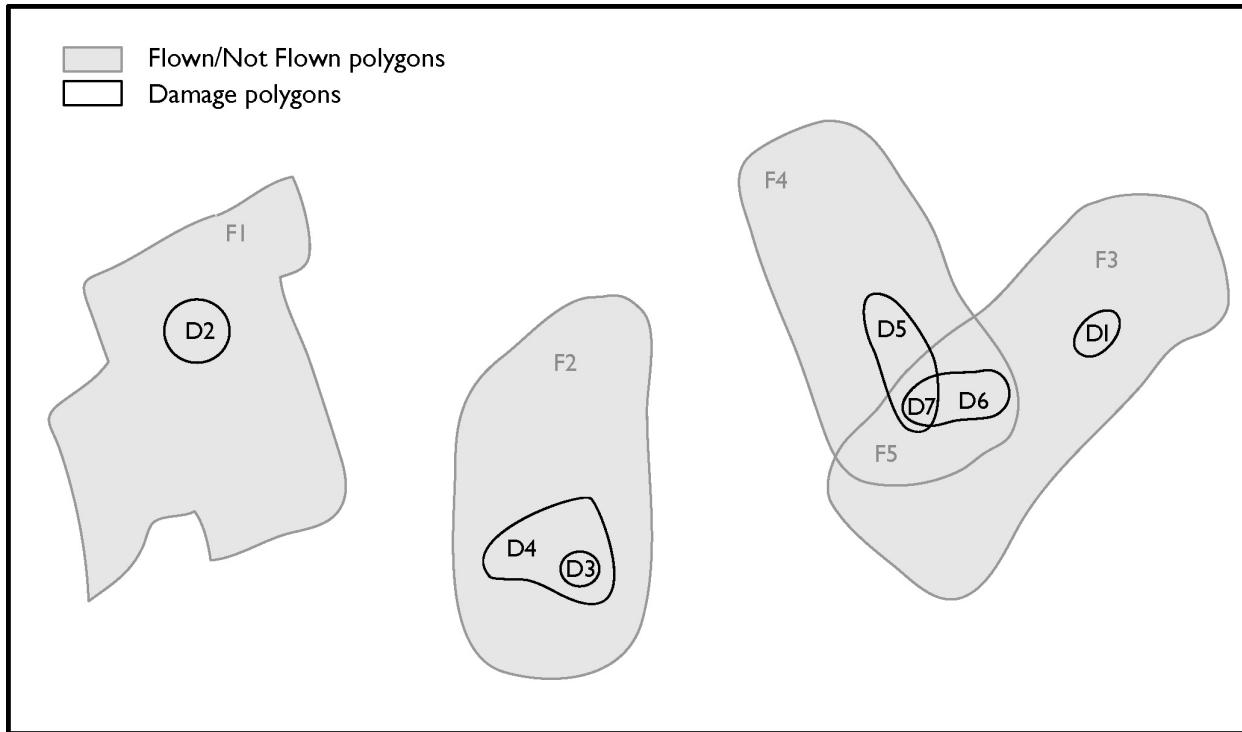
Definition (description): Notes (comments)

Format Type: Character

Format Length: 60

Appendix C Damage and Flown/Not Flown Polygon Examples

The following illustration and polygon attribute table (PAT) examples are provided to clarify various situations that occur both during a survey and while building attribute tables. Information is given for four hypothetical aerial surveys, which resulted in five flown/not flown polygons and seven damage polygons.



Damage Polygons

Polygon D1

Observation 1: Survey 2 - high severity (2) of continuous (1) defoliation (1) by western spruce budworm (12040) in Douglas-fir (202)

Observation 2: No Data

Observation 3: No Data

Polygon D2

Observation 1: Survey 7 - mortality (2) of 150 trees per acre by southern pine beetle (11003) in loblolly/shortleaf pine group (300). Number of trees is calculated from trees per acre (150) multiplied by total acres (0.6).

Observation 2: No Data

Observation 3: No Data

Polygon D3

Observation 1: Survey 7 - No damage (9) in polygon surrounded by polygon with damage

Observation 2: No Data

Observation 3: No Data

Polygon D4

Observation 1: Survey 23 - high severity(2) of continuous (1) defoliation (1) by gypsy moth (12089) in red oak (833)

Observation 2: Survey 23 - high severity(2) of continuous (1) defoliation (1) by gypsy moth (12089) in white oak (802)

Observation 3: Survey 23 - low severity(1) of patchy (2) defoliation (1) by gypsy moth (12089) in white pine (129)

The following three examples describe a situation where the combining of all surveys into one final coverage reveals an area of overlap. As a result, not all final PAT values are a direct reflection of observed attributes. The trees per acre values for polygons D5 and D6 are calculated from observed tree counts divided by acres of the original “parent” polygon. In this example, the total acres for “parent” D5 is D5acres (22.4) plus D7acres (4.4) and the total acres for “parent” D6 is D6acres (58.2) plus D7acres (4.4).

Once coverages are combined and overlap appears, trees per acre values and all attributes EXCEPT number of trees are carried over to the new polygons. Number of trees is then calculated based on acres of the newly created polygons. Therefore, number of trees observed for the parent polygon are now split between what remains of the parent polygon and the new overlap area.

Polygon D5 (parent)

Observation 1: Survey 10 - low severity (1) of continuous (1) defoliation (1) by western spruce budworm (12040) in Douglas-fir (202)

Observation 2: Survey 10 - mortality (2) of 5 trees by Ips engraver beetle (11030) in Douglas-fir (202)

Observation 3: No Data

Polygon D6 (parent)

Observation 1: Survey 2 - mortality (2) of 10 trees by Douglas-fir beetle (11007) in Douglas-fir (202)

Observation 2: No Data

Observation 3: No Data

Polygon D7

This was not observed as a distinct polygon from the air, but once the damage polygons were digitized, it appeared as a product of two overlapping polygons. It will inherit the attributes of its parent polygons EXCEPT for the number of trees, which will be calculated based on the acreage of the overlap polygon.

Observation 1 (from polygon D5): Survey 10 - low severity (1) of continuous (1) defoliation (1) by western spruce budworm (12040) in Douglas-fir (202)

Observation 2 (from polygon D5): Survey 10 - mortality (2) of 5 trees by Ips engraver beetle (11030) in Douglas-fir (202)

Observation 3 (from polygon D6): Survey 2 - mortality (2) of 10 trees by Douglas-fir beetle (11007) in Douglas-fir (202).

Flown/Not Flown Polygons**Polygon F1**

Survey 7 : Smith flew this southern pine beetle survey in one day, beginning and ending on September 13,1999 for the USDA Forest Service (USFS) and the South Carolina Commission of Forestry (SCCF).

Polygon F2

Survey 23 : Brown and Jefferson flew this overview survey in four days, beginning October 1 and ending October 4, 1999 for the USDA Forest Service, Durham field office (DFO).

Polygon F3

Survey 2 : Thompson flew this overview survey in three days, beginning July 6 and ending July 8, 1999 for the USDA Forest Service (USFS).

Polygon F4

Survey 10 : Ogilvy flew this overview survey in one day, beginning and ending August 10, 1999 for the Colorado State Forest Service (CSFS).

Polygon F5

This was not a distinct survey, but once the flown/not flown polygons were digitized, it appeared as a product of two overlapping survey polygons. It will inherit the attributes of its parent polygons.

Item 1 attributes (from survey 2): Thompson flew this overview survey in three days, beginning July 8 and ending July 12, 1999 for the USDA Forest Service (USFS).

Item 2 attributes (from survey 10): Ogilvy flew this overview survey in one day, beginning and ending August 10, 1999 for Colorado State Forest Service (CSFS).

PAT for Damage Polygons

Item Name	Polygon D1	Polygon D2	Polygon D3	Polygon D4	Polygon D5	Polygon D6	Polygon D7
AREA	xxxxx						
PERIMETER	xxxxx						
COVERAGE#	x	x	x	x	x	x	x
COVERAGE-ID	x	x	x	x	x	x	x
RPT_YR	2003	2003	2003	2003	2003	2003	2003
SURVEY_ID1	2	7	7	23	10	2	10
SURVEY_ID2	-1	-1	-1	23	10	-1	10
SURVEY_ID3	-1	-1	-1	23	-1	-1	2
DMG_TYPE1	1	2	9	1	1	2	1
DMG_TYPE2	-1	-1	-1	1	2	-1	2
DMG_TYPE3	-1	-1	-1	1	-1	-1	2
SEVERITY1	2	-1	-1	2	1	-1	1
SEVERITY2	-1	-1	-1	2	-1	-1	-1
SEVERITY3	-1	-1	-1	1	-1	-1	-1
PATTERN1	1	-1	-1	1	2	-1	2
PATTERN2	-1	-1	-1	1	-1	-1	-1
PATTERN3	-1	-1	-1	2	-1	-1	-1
TPA1	-1	150	-1	-1	-1	0.37	-1
TPA2	-1	-1	-1	-1	0.08	-1	0.08
TPA3	-1	-1	-1	-1	-1	-1	0.37
NO_TREES1	-1	90	-1	-1	-1	8	-1
NO_TREES2	-1	-1	-1	-1	5	-1	0
NO_TREES3	-1	-1	-1	-1	-1	-1	2
DCA1	12040	11003	99999	12089	12040	11007	12040
DCA2	99999	99999	99999	12089	11030	99999	11030
DCA3	99999	99999	99999	12089	99999	99999	11007
HOST1	202	-1	-1	833	202	202	202
HOST2	-1	-1	-1	802	202	-1	202
HOST3	-1	-1	-1	129	-1	-1	202
FOR_TYPE1	-1	300	-1	-1	-1	-1	-1
FOR_TYPE2	-1	-1	-1	-1	-1	-1	-1
FOR_TYPE3	-1	-1	-1	-1	-1	-1	-1
ACRES	35.2	0.6	20.9	132.7	58.2	22.3	4.4
NOTES							overlap

PAT for Flown/Not Flown Polygons

Item Name	Polygon F1	Polygon F2	Polygon F3	Polygon F4	Polygon F5
AREA	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
PERIMETER	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
COVERAGE#	X	X	X	X	X
COVERAGE-ID	X	X	X	X	X
RPT_YR	2003	2003	2003	2003	2003
SURVEY_ID1	7	23	2	10	2
SURVEY_ID2	7	23	-1	-1	10
SURVEY_ID3	-1	-1	-1	-1	-1
FLOWN1	1	1	1	1	1
FLOWN2	1	1	-1	-1	1
FLOWN3	-1	-1	-1	-1	-1
AGENCY1	SCCF	DFO	USFS	CSFS	USFS
AGENCY2	USFS	DFO	-1	-1	CSFS
AGENCY3	-1	-1	-1	-1	-1
SURVEYOR1	Smith	Brown	Thompson	Ogilvy	Thompson
SURVEYOR2	Smith	Jefferson	-1	-1	Ogilvy
SURVEYOR3	-1	-1	-1	-1	-1
BEGIN1	19990913	19991001	19990706	19990810	19990706
BEGIN2	19990913	19991001	-1	-1	19990810
BEGIN3	-1	-1	-1	-1	-1
END1	19990913	19991004	19990708	19990810	19990708
END2	19990913	19991004	-1	-1	19990810
END3	-1	-1	-1	-1	-1
FL_DAYS1	1	4	3	1	3
FL_DAYS2	1	4	-1	-1	1
FL_DAYS3	-1	-1	-1	-1	-1
PURPOSE1	SPB detection	Overview	Overview	Overview	Overview
PURPOSE2	SPB detection	Overview	-1	-1	Overview
PURPOSE3	-1	-1	-1	-1	-1
FL_NOTES					

Appendix D Cooperating Agency Codes

The following table lists the aerial survey cooperating agencies and codes to be used in the *agency1*, *agency2*, *agency3* fields of the flown/not flown coverages. The contents of this list is available in digital form (.dbf) elsewhere on this web site.

Code	Agency Name
AFC	Alabama Forestry Commission
ADNR	Alaska Department of Natural Resources
AZFH	Arizona Forest Health Program, University of Arizona
AZS	Arizona State Land Department
ARFC	Arkansas Forestry Commission
CDF	California Department of Forestry
CSFS	Colorado State Forest Service
CTAES	Connecticut Agricultural Experiment Station
DEDA	Delaware Department of Agriculture
FDOF	Florida Division of Forestry
FTA	Fort Apache Indian Reservation
GFC	Georgia Forestry Commission
HOA	Hopi Indian Reservation
IDL	Idaho Department of Lands
KDF	Kentucky Division of Forestry
LDAF	Louisiana Department of Agriculture and Forestry
MEFS	Maine Forest Service
MDDA	Maryland Department of Agriculture
MADEM	Massachusetts Department of Environmental Management
MIDNR	Michigan Department of Natural Resources
MNDNR	Minnesota Department of Natural Resources
MFC	Mississippi Forestry Commission
MODC	Missouri Department of Conservation
NAO	Navajo Area Indian Reservation
NDCNR	Nevada Department of Conservation
NHDRED	New Hampshire Department of Resources and Economic Development
NJFS	New Jersey Forest Service
NMCES	New Mexico Cooperative Extension Service
NYDEC	New York Department of Environmental Conservation
NCDFR	North Carolina Division of Forest Resources
OHDA	Ohio Department of Agriculture
OHDF	Ohio Division of Forestry
OFS	Oklahoma Forestry Services
ODF	Oregon Department of Forestry
PABOF	Pennsylvania Bureau of Forestry
RIDEM	Rhode Island Department of Environmental Management
SCA	San Carlos Indian Reservation
SCCF	South Carolina Commission of Forestry
TDF	Tennessee Division of Forestry
TFS	Texas Forest Service
USFS	USDA Forest Service
ASF	USDA Forest Service, Apache/Sitgreaves National Forest
COF	USDA Forest Service, Coconino National Forest

Code	Agency Name
CNF	USDA Forest Service, Coronado National Forest
DFO	USDA Forest Service, Durham Field Office
KNF	USDA Forest Service, Kaibab National Forest
MFO	USDA Forest Service, Morgantown Field Office
PNF	USDA Forest Service, Prescott National Forest
SPFO	USDA Forest Service, Saint Paul Field Office
TNF	USDA Forest Service, Tonto National Forest
BIA	USDI Bureau of Indian Affairs
PAO	USDI Bureau of Indian Affairs, Phoenix Area Office
TCA	USDI Bureau of Indian Affairs, Truxton Canon Agency
BLM	USDI Bureau of Land Management
ASD	USDI Bureau of Land Management, Arizona Strip District
PHD	USDI Bureau of Land Management, Phoenix Field Office
SAD	USDI Bureau of Land Management, Safford Field Office
CAP	USDI National Park Service, Canyon De Chelly National Monument
GCP	USDI National Park Service, Grand Canyon National Park
HUP	USDI National Park Service, Hubbell Trading Post
NAP	USDI National Park Service, Navajo National Monument
SAP	USDI National Park Service, Saguaro National Monument
PPA	USDI National Park Service, Wupatki/Sunset Crater National Monument
VTDFPR	Vermont Department of Forests, Parks and Recreation
VDF	Virginia Department of Forestry
WDNR	Washington Department of Natural Resources
WVDA	West Virginia Department of Agriculture
WIDNR	Wisconsin Department of Natural Resources
WSFD	Wyoming State Forestry Division

Appendix E Damage Causal Agent Codes

The table in this appendix contains the list of damage causal agents and the associated codes to be used in the *dca1*, *dca2*, and *dca3* fields of the damage coverages. These codes are taken from the VEG_DISTURBANCE_AGENTS table of the [FSVeg Field Sampled Vegetation Data Dictionary version 1.3](#), dated March 12, 1999. That table breaks disturbance agents into two fields. The first field is named Category and contains the first two digits of the codes used here. The second field is named Agent and contains the last three digits of the codes used here. For Forest Health Monitoring aerial survey purposes, the single five-digit code is used. It should also be noted that some codes have been added to this list since the release of FSVeg. These codes will be added to the FSVeg data dictionary in a future release. The contents of this list is available in digital form (.dbf) elsewhere on this web site.

Code	Common Name	Scientific Name
10000	General Insects	
10001	thrips	
10002	tip moth	
10003	wasp	
10004	Chinese rose beetle	<i>Adoretus sinicus</i>
10005	rose beetle	<i>Adoretus versutus</i>
10006	coconut hispid beetle	<i>Brontispa longissima</i>
10007	clerid beetle	<i>Cleridae</i>
10008	weevil	<i>Curculionidae</i>
10009	green rose chafer	<i>Dichelonyx backi</i>
10010	Allegheny mound ant	<i>Formica exsectoides</i>
10011	ant	<i>Formicidae</i>
10012	stick insect	<i>Graeffea crovanii</i>
10013	Hulodes cranea	<i>Hulodes cranea</i>
10014	conifer swift moth	<i>Korsheltellus gracilis</i>
10015	Caroline shortnosed weevil	<i>Lophothetes spp.</i>
10016	coconut rhinoceros beetle	<i>Oryctes rhinoceros</i>
10017	bagworm moth	<i>Psychidae</i>
10018	coconut palm weevil	<i>Rhobdoscelus asperipennis</i>
10019	scarab	<i>Scarabaeidae</i>
10020	ash white fly	<i>Siphoninus phillyreae</i>
10021	unknown	<i>Stereomnius carinatus</i>
10022	pyralid moth	<i>Thliptoceras octoquattale</i>
10023	wood wasps	<i>Siricidae spp.</i>
11000	Bark Beetles	
11001	roundheaded pine beetle	<i>Dendroctonus adjunctus</i>
11002	western pine beetle	<i>Dendroctonus brevicomis</i>
11003	southern pine beetle	<i>Dendroctonus frontalis</i>
11004	Jeffery pine beetle	<i>Dendroctonus jeffreyi</i>
11005	lodgepole pine beetle	<i>Dendroctonus murrayanae</i>
11006	mountain pine beetle	<i>Dendroctonus ponderosae</i>
11007	Douglas-fir beetle	<i>Dendroctonus pseudotsugae</i>
11008	Allegheny spruce beetle	<i>Dendroctonus punctatus</i>
11009	spruce beetle	<i>Dendroctonus rufipennis</i>
11010	eastern larch beetle	<i>Dendroctonus simplex</i>

Code	Common Name	Scientific Name
11011	black turpentine beetle	<i>Dendroctonus terebrans</i>
11012	red turpentine beetle	<i>Dendroctonus valens</i>
11013	unknown	<i>Dryocoetes affaber</i>
11014	unknown	<i>Dryocoetes autographus</i>
11015	western balsam bark beetle	<i>Dryocoetes confusus</i>
11016	unknown	<i>Dryocoetes sechelti</i>
11017	ash bark beetles	<i>Hylesinus spp.</i>
11018	native elm bark beetle	<i>Hylurgopinus rufipes</i>
11019	pinon ips	<i>Ips confusus</i>
11020	small southern pine engraver	<i>Ips avulsus</i>
11021	sixspined ips	<i>Ips calligraphus</i>
11022	emarginate ips	<i>Ips emarginatus</i>
11023	southern pine engraver beetle	<i>Ips grandicollis</i>
11024	unknown	<i>Ips latidens</i>
11025	Arizona five-spined ips	<i>Ips lecontei</i>
11026	Monterey pine ips	<i>Ips mexicanus</i>
11027	California fivespined ips	<i>Ips paraconfusus</i>
11028	northern spruce engraver beetle	<i>Ips perturbatus</i>
11029	pine engraver	<i>Ips pini</i>
11030	Ips engraver beetles	<i>Ips spp.</i>
11031	unknown	<i>Ips tridens</i>
11032	western ash bark beetle	<i>Leperisinus californicus</i>
11033	Oregon ash bark beetle	<i>Leperisinus oregonus</i>
11034	unknown	<i>Orthotomicus caelatus</i>
11035	cedar bark beetles	<i>Phleosinus spp.</i>
11036	western cedar bark beetle	<i>Phloeosinus punctatus</i>
11037	tip beetles	<i>Pityogenes spp.</i>
11038	Douglas-fir twig beetle	<i>Pityophthorus pseudotsugae</i>
11039	twig beetles	<i>Pityophthorus spp.</i>
11040	foureyed spruce beetle	<i>Polygraphus rufipennis</i>
11041	fir root bark beetle	<i>Pseudohylesinus granulatus</i>
11042	unknown	<i>Pseudohylesinus dispar</i>
11043	Douglas-fir pole beetle	<i>Pseudohylesinus nebulosus</i>
11044	silver fir beetle	<i>Pseudohylesinus sericeus</i>
11045	small European elm bark beetle	<i>Scolytus multistriatus</i>
11046	spruce engraver	<i>Scolytus piceae</i>
11047	hickory bark beetle	<i>Scolytus quadrispinosus</i>
11048	true fir bark beetles	<i>Scolytus spp.</i>

Code	Common Name	Scientific Name
11049	Douglas-fir engraver	<i>Scolytus unispinosus</i>
11050	fir engraver	<i>Scolytus ventralis</i>
11051	striped ambrosia beetle	<i>Tryachykele lineatum</i>
11052	Sitka spruce engraver beetle	<i>Ips connecinnus</i>
11053	four-eyed bark beetle	<i>Polygraphus spp.</i>
11054	hemlock beetle	<i>Pseudohylesinus tsugae</i>
11055	spruce ips	<i>Ips pilifrons</i>
11056	Mexican pine beetle	<i>Dendroctonus mexicanus</i>
11999	western bark beetle complex	
12000	Defoliators	
12001	casebearer	
12002	leaf tier	
12003	looper	
12004	needleminer	
12005	sawfly	
12006	skeletonizer	
12007	larger elm leaf beetle	<i>Monocesta coryli</i>
12008	spanworm	
12009	webworm	
12010	pine false webworm	<i>Acantholyda erythrocephala</i>
12011	western blackheaded budworm	<i>Acleris gloverana</i>
12012	eastern blackheaded budworm	<i>Acleris variana</i>
12013	whitefly	<i>Aleyrodidae</i>
12014	fall cankerworm	<i>Alsophila pometaria</i>
12015	alder flea beetle	<i>Altica ambiens</i>
12016	mountain mahogany looper	<i>Anacamptodes clivinaria profanata</i>
12017	birch leaffolder	<i>Ancylis disigerana</i>
12018	oak worms	<i>Anisota spp.</i>
12019	orange-striped oakworm	<i>Anisota senatoria</i>
12020	western larch sawfly	<i>Anoplonyx occidens</i>
12021	fruit tree leafroller	<i>Archips argyrospila</i>
12022	ugly nest caterpillar	<i>Archips cerasivorana</i>
12023	boxelder defoliator	<i>Archips negundanus</i>
12024	oak leafroller	<i>Archips semiferana</i>
12025	birch sawfly	<i>Arge pectoralis</i>
12026	arborvitae leafminer	<i>Argyresthia thuiella</i>
12027	coconut scale	<i>Aspidiotus destructor</i>

Code	Common Name	Scientific Name
12028	texas leafcutting ant	<i>Atta texana</i>
12029	oak skeletonizer	<i>Bucculatrix ainsliella</i>
12030	pear sawfly	<i>Caliroa cerasi</i>
12031	scarlet oak sawfly	<i>Caliroa quercuscoccineae</i>
12032	elm calligrapha	<i>Calligrapha scalaris</i>
12033	boxelder leafroller	<i>Caloptilia negundella</i>
12034	maple petiole borer	<i>Caulocampus acericaulis</i>
12035	spruce webspinning sawfly	<i>Cephalcia fascipennis</i>
12036	two-year budworm	<i>Choristoneura biennis</i>
12037	large aspen tortrix	<i>Choristoneura conflictana</i>
12038	spruce budworm	<i>Choristoneura fumiferana</i>
12039	sugar pine tortrix	<i>Choristoneura lambertiana</i>
12040	western spruce budworm	<i>Choristoneura occidentalis</i>
12041	jack pine budworm	<i>Choristoneura pinus</i>
12042	Modoc budworm	<i>Choristoneura retiniana</i>
12043	aspen leaf beetle	<i>Chrysomela crotchi</i>
12044	cottonwood leaf beetle	<i>Chrysomela scripta</i>
12045	leafhopper	<i>Cicadellidae</i>
12046	poplar tentmaker	<i>Closteria inclusa</i>
12047	larch casebearer	<i>Coleophora laricella</i>
12048	birch casebearer	<i>Coleophora serratella</i>
12049	lodgepole needleminer	<i>Coleotechnites milleri</i>
12050	ponderosa needleminer	<i>Coleotechnites spp.</i>
12051	Black Hills pandora moth	<i>Coloradia doris</i>
12052	pandora moth	<i>Coloradia pandora</i>
12053	sycamore lace bug	<i>Corythucha ciliata</i>
12054	lace bugs	<i>Corythucha spp.</i>
12055	oak leaftier	<i>Croesia semipurpurana</i>
12056	dusky birch sawfly	<i>Croesus latitarsus</i>
12057	walnut caterpillar	<i>Datana integerrima</i>
12058	yellownecked caterpillar	<i>Datana ministra</i>
12059	walkingstick	<i>Diapheromera femorata</i>
12060	spruce coneworm	<i>Dioryctria reniculeloides</i>
12061	introduced pine sawfly	<i>Diprion similis</i>
12062	greenstriped mapleworm	<i>Dryocampa rubicunda</i>
12063	spruce needleminer (east)	<i>Endothenia albolineana</i>
12064	elm spanworm	<i>Ennomos subsignaris</i>
12065	maple trumpet skeletonizer	<i>Epinotia acieriella</i>

Code	Common Name	Scientific Name
12066	white fir needleminer	<i>Epinotia meritana</i>
12067	linden looper	<i>Erannis tiliaria</i>
12068	brown tail moth	<i>Euproctis chrysorrhoea</i>
12069	pine needleminer	<i>Exoteleia pinifoliella</i>
12070	birch leafminer	<i>Fenusia pusilla</i>
12071	elm leafminer	<i>Fenusia ulmi</i>
12072	geometrid moth	<i>Geometridae</i>
12073	leafblotch miner	<i>Gracillariidae</i>
12074	spotted tussock moth	<i>Halisidota maculata</i>
12075	pale tussock moth	<i>Halysidota tessellaris</i>
12076	hesperiid moth	<i>Hasora choromus</i>
12077	brown day moth	<i>Hemileuca eglanterina</i>
12078	buck moth	<i>Hemileuca maia</i>
12079	saddled prominent	<i>Heterocampa guttivitta</i>
12080	variable oakleaf caterpillar	<i>Heterocampa manteo</i>
12081	cherry scallop shell moth	<i>Hydria prunivorata</i>
12082	fall webworm	<i>Hyphantria cunea</i>
12083	hemlock looper	<i>Lambdina fiscellaria</i>
12084	unknown	<i>Lambdina punctat</i>
12085	tent caterpillar moth	<i>Lasiocampidae</i>
12086	satin moth	<i>Leucoma salicis</i>
12087	willow leafblotch miner	<i>Lithocletis spp.</i>
12088	aspen blotchminer	<i>Lithocletis tremuloidiella</i>
12089	gypsy moth	<i>Lymantria dispar</i>
12090	cottonwood leafminers	<i>Lyonetia spp.</i>
12091	dogwood sawfly	<i>Macremphytus tarsatus</i>
12092	rose chafer	<i>Macroderactylus subspinosis</i>
12093	eastern tent caterpillar	<i>Malacosoma americanum</i>
12094	western tent caterpillar	<i>Malacosoma californicum</i>
12095	Pacific tent caterpillar	<i>Malacosoma constrictum</i>
12096	forest tent caterpillar	<i>Malacosoma disstria</i>
12097	southwestern tent caterpillar	<i>Malacosoma incurvum</i>
12098	leafcutting bees	<i>Megachilidae</i>
12099	blister beetle	<i>Meloidae</i>
12100	early birch leaf edgeminer	<i>Messa nana</i>
12101	juniper sawfly	<i>Monocetus fulvus</i>
12102	willow sawfly	<i>Nematus spp.</i>
12103	balsam fir sawfly	<i>Neodiprion abietis</i>

Code	Common Name	Scientific Name
12104	lodgepole sawfly	<i>Neodiprion burkei</i>
12105	blackheaded pine sawfly	<i>Neodiprion excitans</i>
12106	pine infesting sawflies	<i>Neodiprion fulviceps</i>
12107	redheaded pine sawfly	<i>Neodiprion lecontei</i>
12109	ponderosa pine sawfly	<i>Neodiprion mundus</i>
12110	white pine sawfly	<i>Neodiprion pinetum</i>
12111	jack pine sawfly	<i>Neodiprion pratti banksianae</i>
12112	Virginia pine sawfly	<i>Neodiprion pratti pratti</i>
12113	European pine sawfly	<i>Neodiprion sertifer</i>
12114	loblolly pine sawfly	<i>Neodiprion taedae linearis</i>
12115	hemlock sawfly	<i>Neodiprion tsugae</i>
12116	pine butterfly	<i>Neophasia menapia</i>
12117	false hemlock looper	<i>Nepytia canosaria</i>
12118	California tortoiseshell	<i>Nymphalis californica</i>
12119	locust leafminer	<i>Odontota dorsalis</i>
12120	Bruce spanworm	<i>Operophtera bruceata</i>
12121	rusty tussock moth	<i>Orgyia antiqua</i>
12122	whitemarked tussock moth	<i>Orgyia leucostigma</i>
12123	Douglas-fir tussock moth	<i>Orgyia pseudotsugata</i>
12124	western tussock moth	<i>Orgyia vetusta</i>
12125	spring cankerworm	<i>Paleacrita vernata</i>
12126	black citrus swallowtail butterfly	<i>Papilio polytes</i>
12127	maple leafcutter	<i>Paraclemensia acerifoliella</i>
12128	pine tussock moth	<i>Parorgyia grisefacta</i>
12129	poinciana looper	<i>Pericyma cruegeri</i>
12130	half-wing geometer	<i>Phigalia titea</i>
12131	Phoberia moth	<i>Phoberia atomaris</i>
12132	California oakworm	<i>Phryganidia californica</i>
12133	European snout beetle	<i>Phyllobius oblongus</i>
12134	citrus leafminer	<i>Phylloconistis citrella</i>
12135	aspen leafminer	<i>Phylloconistis populiella</i>
12136	yellowheaded spruce sawfly	<i>Pikonema alaskensis</i>
12137	tenlined June beetle	<i>Polyphylla decemlineata</i>
12138	Japanese beetle	<i>Popillia japonica</i>
12139	larch sawfly	<i>Pristiphora erichsonii</i>
12140	mountain-ash sawfly	<i>Pristiphora geniculata</i>
12141	elm leaf beetle	<i>Pyrrhalta luteola</i>
12142	spearmarked black moth	<i>Rheumaptera hastata</i>

Code	Common Name	Scientific Name
12143	giant silkworm moth	<i>Saturniidae</i>
12144	redhumped caterpillar	<i>Schizura concinna</i>
12145	redbanded thrips	<i>Selenothrips rubrocinctus</i>
12146	larch looper	<i>Semiothisa sexmaculata</i>
12147	maple leafroller	<i>Sparganothis acerivorana</i>
12148	redhumped oakworm	<i>Symmerista canicosta</i>
12149	orangehumped mapleworm	<i>Symmerista leucitys</i>
12150	spruce needleminer (west)	<i>Taniva albolineana</i>
12151	maple webworm	<i>Tetralopha asperatella</i>
12152	pine webworm	<i>Tetralopha robustella</i>
12153	imported basswood thrips	<i>Thrips calcaratus</i>
12154	bagworm	<i>Thyridopteryx ephemeraeformis</i>
12155	leafroller/seed moth	<i>Tortricidae</i>
12156	willow defoliation	<i>Tortricidae</i>
12157	euonymus caterpillar	<i>Yponomeuta spp.</i>
12158	spruce bud moth	<i>Zeiraphera canadensis</i>
12159	larch bud moth	<i>Zeiraphera improbana</i>
12160	pine needle sheathminer	<i>Zelleria haimbachi</i>
12161	cypress looper	<i>Anacamptodes pergracilis</i>
12162	cottonwood leaf beetle	<i>Chrysomela spp.</i>
12163	pine colaspis	<i>Colaspis pini</i>
12164	saddle-backed looper	<i>Ectropis crepuscularia</i>
12165	leaf roller	<i>Epinotia solandriana</i>
12166	New Mexico fir looper	<i>Galenara consimilis</i>
12167	striped alder sawfly	<i>Hemichroa crocea</i>
12168	green-striped looper	<i>Melanoplophia imitata</i>
12169	willow leaf blotchminer	<i>Micrurapteryx salicifoliella</i>
12170	unknown	<i>Neodiprion autumnalis</i>
12171	pinon sawfly	<i>Neodiprion edulicolus</i>
12172	unknown	<i>Neodiprion gilletti</i>
12173	unknown	<i>Neodiprion ventralis</i>
12174	pine looper	<i>Phaeoura mexicanaria</i>
12175	unknown	<i>Zadiprion rohweri</i>
12176	unknown	<i>Zadiprion townsendi</i>
12177	Douglas-fir budmoth	<i>Zeiraphera hesperiana</i>
12178	western oak looper	<i>Lambdina fiscellaria somniaria</i>
12179	phantom hemlock looper	<i>Nepytia phantasmaria</i>
12180	tent caterpillar	<i>Malacosoma spp.</i>

Code	Common Name	Scientific Name
12181	Abbot's sawfly	<i>Neodiprion abbotii</i>
12182	slash pine sawfly	<i>Neodiprion merkeli</i>
12183	sand pine sawfly	<i>Neodiprion pratti</i>
12184	melalueca leaf weevil	<i>Oxyops vitiosa</i>
12185	cypress leaf beetle	<i>Systema marginalis</i>
12186	unknown	<i>Nepytia janetae</i>
12187	agromyzid fly	<i>Agromyza viridula</i>
12188	elm sawfly	<i>Cimbex americana</i>
12189	june beetle	<i>Phyllophaga spp.</i>
12190	hickory tussock moth	<i>Halisidota caryaef</i>
12191	pin oak sawfly	<i>Caliroa lineata</i>
12192	palmerworm	<i>Dichomeris ligulella</i>
12193	pitch pine looper	<i>Lambdina athasaria pellucidaria</i>
12194	red pine sawfly	<i>Neodiprion nanulus nanulus</i>
12195	pine tip moth	<i>Argyrotaenia pinatubana</i>
12196	baldcypress leafroller	<i>Archips goyerana</i>
13000	Chewing Insects	
13001	grasshopper	
13002	shorthorn grasshoppers	<i>Acrididae</i>
13003	black cutworm	<i>Agrotis ipsilon</i>
13004	Palau coconut beetle	<i>Brontispa palauenis</i>
13005	clearwinged grasshopper	<i>Cannula pellucida</i>
13006	cicadas	<i>Cicadidae</i>
13007	eurytomids	<i>Eurytoma spp.</i>
13008	cutworms	<i>Euxoa excellens</i>
13009	whitefringed beetles	<i>Graphognathus spp.</i>
13010	pales weevil	<i>Hylobius pales</i>
13011	vegetable weevil	<i>Listroderes difficilis</i>
13012	periodical cicada	<i>Magicicada septendecim</i>
13013	migratory grasshopper	<i>Melanoplus sanguinipes</i>
13014	valley grasshopper	<i>Oedaleonotus enigma</i>
13015	strawberry root weevil	<i>Otiorhyynchus ovatus</i>
13016	black vine weevil	<i>Otiorhynchus sulcatus</i>
13017	pandanus beetle	<i>Oxycephala pandani</i>
13018	spaeth pandanus	<i>Oxycephala spaethi</i>
13019	agamemnon butterfly	<i>Papilio agamemnon</i>
13020	northern pitch twig moth	<i>Petrova albicapitana</i>

Code	Common Name	Scientific Name
13021	ponderosa pine tip moth	<i>Rhyacionia zozana</i>
13022	pine needle weevil	<i>Scythropus spp.</i>
13023	coconut longhorned grasshopper	<i>Segestes unicolor</i>
13024	clover root curculio	<i>Sitona hispidulus</i>
13025	unknown	<i>Thrips madronii</i>
13026	ash plant bug	<i>Tropidosteptes amoenus</i>
13027	shorthorned grasshopper	<i>Valanga nigricornis</i>
13028	pitch-eating weevil	<i>Pachylobius picivorus</i>
13029	deodar weevil	<i>Pissodes nemorensis</i>
13030	adana tip moth	<i>Rhyacionia adana</i>
14000	Sucking Insects	
14001	scale insect	
14002	western larch wooly aphid	<i>Adelges oregonensis</i>
14003	balsam woolly adelgid	<i>Adelges piceae</i>
14004	hemlock woolly adelgid	<i>Adelges tsugae</i>
14005	spiraling whitefly	<i>Aleurodicus dispersus</i>
14006	aphid	<i>Aphididae</i>
14007	pine spittlebug	<i>Aphrophora parallelia</i>
14008	western pine spittlebug	<i>Aphrophora permutata</i>
14009	Saratoga spittlebug	<i>Aphrophora saratogensis</i>
14010	spittlebug	<i>Cercopidae</i>
14011	wax scale	<i>Ceroplastes spp.</i>
14012	pine needle scale	<i>Chionaspis pinifoliae</i>
14014	giant conifer aphids	<i>Cinara spp.</i>
14015	white pine aphid	<i>Cinara strobi</i>
14016	beech scale	<i>Cryptococcus fagisuga</i>
14017	spruce aphid	<i>Elatobium abietinum</i>
14018	woolly apple aphid	<i>Eriosoma lanigerum</i>
14019	striped mealybug	<i>Ferrisia vergata</i>
14020	elongate hemlock scale	<i>Fiorinia externa</i>
14021	coconut red scale	<i>Furcaspis oceanica</i>
14022	pine thrips	<i>Gnophothrips spp.</i>
14023	leucaena psyllid	<i>Heteropsylla cubana</i>
14024	honeysuckle aphids	<i>Hyadaphis tataricae</i>
14025	Egyptian fluted scale	<i>Icerya aegyptiaca</i>
14026	Lecanium scale	<i>Lecanium spp.</i>
14027	common falsepit scale	<i>Lecanodiaspis prosopidis</i>

Code	Common Name	Scientific Name
14028	oystershell scale	<i>Lepidosaphes ulmi</i>
14029	pinyon needle scale	<i>Matsucoccus acalyptus</i>
14030	ponderosa pine twig scale	<i>Matsucoccus bisetosus</i>
14031	pine twig scale	<i>Matsucoccus californicus</i>
14032	ponderosa pine scale	<i>Matsucoccus degeneratus</i>
14033	red pine scale	<i>Matsucoccus resinosae</i>
14034	Prescott scale	<i>Matsucoccus vexillorum</i>
14035	treehoopers	<i>Membracidae</i>
14036	hibiscus psyllid	<i>Mesohomotoma hibisci</i>
14037	balsam twig aphid	<i>Mindarus abietinus</i>
14038	hibiscus mealybug	<i>Nipaecoccus vastator</i>
14039	black pineleaf scale	<i>Nuculaspis californica</i>
14040	spruce spider mite	<i>Oligonychus ununquis</i>
14041	twig girdler	<i>Oncideres cingulata</i>
14042	woolly alder aphid	<i>Paraproctiphilus tessellatus</i>
14043	maple aphids	<i>Periphyllus spp.</i>
14044	spruce bud scale	<i>Physokermes piceae</i>
14045	red pine adelgid	<i>Pineus borneri</i>
14046	pine leaf adelgid	<i>Pineus pinifoliae</i>
14047	white pine adelgid	<i>Pineus spp.</i>
14048	pine bark adelgid	<i>Pineus strobi</i>
14049	root aphid	<i>Prociphilus americanus</i>
14050	mealybug	<i>Pseudococcidae</i>
14051	cottony maple scale	<i>Pulvinaria innumerabilis</i>
14052	fir mealybug	<i>Puto cupressi</i>
14053	Douglas-fir mealybug	<i>Puto profusus</i>
14054	spruce mealybug	<i>Puto sandini</i>
14055	hemispherical scale	<i>Saissetia coffeae</i>
14056	woolly pine needle aphid	<i>Schizolachnus piniradiatae</i>
14057	steatococcus scale	<i>Steatococcus samaraius</i>
14058	pear thrips	<i>Taeniothrips inconsequens</i>
14059	mulberry whitefly	<i>Tetraleurodes mori</i>
14060	tuliptree scale	<i>Toumeyella liriodendri</i>
14061	pine tortoise scale	<i>Toumeyella parvicornis</i>
14062	citrus snow scale	<i>Unaspis citri</i>
14063	birch aphid	<i>Euceraphis betulae</i>
14064	Kermes scale	<i>Allokermes spp.</i>
14065	Casuarina spittlebug	<i>Clastoptera undulata</i>

Code	Common Name	Scientific Name
14066	giant bark aphid	<i>Longistigma caryae</i>
14067	wooly pine scale	<i>Pseudophilippia quaintancii</i>
14068	european elm scale	<i>Gossypharia spuria</i>
14069	elm scurfy scale	<i>Chionaspis americana</i>
15000	Boring Insects	
15001	shoot borer	
15002	termite	
15003	ponderosa pine bark borer	<i>Acanthocinus princeps</i>
15004	bronze birch borer	<i>Agrilus anxius</i>
15005	twolined chestnut borers	<i>Agrilus bilineatus</i>
15006	bronze poplar borer	<i>Agrilus liragus</i>
15007	carpenter bees	<i>Apidae</i>
15008	flatheaded borer	<i>Buprestidae</i>
15009	golden buprestid	<i>Buprestis aurulenta</i>
15010	carpenter ants	<i>Camponotus spp.</i>
15011	gouty pitch midge	<i>Cecidomyia piniinopis</i>
15012	shootboring sawflies	<i>Cephidae</i>
15013	roundheaded borer	<i>Cerambycidae</i>
15014	flatheaded apple tree borer	<i>Chrysobothris femorata</i>
15015	cranberry girdler	<i>Chrysoteuchia topiaria</i>
15016	Columbian timber beetle	<i>Corthylus columbianus</i>
15017	pitted ambrosia beetle	<i>Corthylus punctatissimus</i>
15018	carpenterworm moths	<i>Cossidae</i>
15019	poplar and willow borer	<i>Cryptorhynchus lapathi</i>
15020	pine reproduction weevil	<i>Cylindrocopturus eatoni</i>
15021	Douglas-fir twig weevil	<i>Cylindrocopturus furnissi</i>
15022	Zimmerman pine moth	<i>Dioryctria zimmermani</i>
15023	oak twig pruners	<i>Elaphidionoides spp.</i>
15024	twig pruner	<i>Elaphidionoides villosus</i>
15025	lesser cornstalk borer	<i>Elasmopalpus lignosellus</i>
15026	red oak borer	<i>Enaphalodes rufulus</i>
15027	ponderous borer	<i>Ergates spiculatus</i>
15028	eastern pine shoot borer	<i>Eucosma gloriola</i>
15029	western pine shoot borer	<i>Eucosma sonomana</i>
15030	Eucosma species	<i>Eucosma spp.</i>
15031	sugar maple borer	<i>Glycobius speciosus</i>
15032	Goes borers	<i>Goes spp.</i>

Code	Common Name	Scientific Name
15033	pine root collar weevil	<i>Hylobius radicis</i>
15034	Warren's collar weevil	<i>Hylobius warreni</i>
15035	powderpost beetle	<i>Lyctidae</i>
15036	tarnished plant bug	<i>Lygus lineolaris</i>
15037	unknown	<i>Magdalis spp.</i>
15038	white pine bark miner	<i>Marmara fasciella</i>
15039	locust borer	<i>Megacyllene robiniae</i>
15040	California flathead borer	<i>Melanophila californica</i>
15041	flatheaded fir borer	<i>Melanophila drummondi</i>
15042	whitespotted sawyer	<i>Monochamus scutellatus</i>
15043	redheaded ash borer	<i>Neoclytus acuminatus</i>
15044	western ash borer	<i>Neoclytus conjunctus</i>
15045	oberea shoot borers	<i>Oberea spp.</i>
15046	eucalyptus longhorned borer	<i>Phoracantha semipunctata</i>
15047	northern pine weevil	<i>Pissodes approximatus</i>
15048	unknown	<i>Pissodes dubius</i>
15049	Monterey pine weevil	<i>Pissodes radiatae</i>
15050	white pine weevil	<i>Pissodes strobi</i>
15051	lodgepole terminal weevil	<i>Pissodes terminalis</i>
15052	ambrosia beetles	<i>Platypus spp.</i>
15053	cottonwood borer	<i>Plectrodera scalator</i>
15054	balsam shootboring sawfly	<i>Pleroneura brunneicornis</i>
15055	pine gall weevil	<i>Podapion gallicola</i>
15056	ash borer	<i>Podesesia syringae fraxini</i>
15057	lilac borer	<i>Podosesia syringae</i>
15058	carpenterworm	<i>Prionoxystus robiniae</i>
15059	maple shoot borers	<i>Proterteras spp.</i>
15060	western subterranean termite	<i>Reticulitermes hesperus</i>
15061	coconut trunk weevil	<i>Rhabdoscelus asperipennis</i>
15062	New Guinea sugarcane weevil	<i>Rhabdoscelus obscurus</i>
15063	European pine shoot moth	<i>Rhyacionia buoliana</i>
15064	western pine tip moth	<i>Rhyacionia bushnelli</i>
15065	Nantucket pine tip moth	<i>Rhyacionia frustrana</i>
15066	lodgepole pine tip moth	<i>Rhyacionia montana</i>
15067	southwestern pine tip moth	<i>Rhyacionia neomexicana</i>
15068	poplar borer	<i>Saperda calcarata</i>
15069	roundheaded appletree borer	<i>Saperda candida</i>
15070	Saperda shoot borer	<i>Saperda spp.</i>

Code	Common Name	Scientific Name
15071	clearwing moths	<i>Sesiidae</i>
15072	dogwood borer	<i>Synanthedon scitula</i>
15073	roundheaded fir borer	<i>Tetropium abietis</i>
15074	western larch borer	<i>Tetropium velutinum</i>
15075	western cedar borer	<i>Trachykele blondeli</i>
15076	Douglas-fir pitch moth	<i>Vespa mima novaroensis</i>
15077	sequoia pitch moth	<i>Vespa mima sequoia</i>
15078	black twig borer	<i>Xylosandrus compactus</i>
15079	Pacific dampwood termite	<i>Zootermopsis angusticollis</i>
15080	subtropical pine tip moth	<i>Rhyacionia subtropica</i>
15081	Asian ambrosia beetle	<i>Xylosandrus crassiusculus</i>
15082	Asian longhorned beetle	<i>Anoplophora glabripennis</i>
15083	cottonwood twig borer	<i>Gypsonoma haimbachiana</i>
15084	southern pine sawyer	<i>Monochamus titillator</i>
15085	banded ash borer	<i>Neoclytus capraea</i>
15086	emerald ash borer	<i>Agrilus planipennis</i>
16000	Seed/Cone/Flower/Fruit Insects	
16001	Douglas-fir cone moth	<i>Barbara colfaxiana</i>
16002	lodgepole cone beetle	<i>Conophthorus contortae</i>
16003	limber pine cone beetle	<i>Conophthorus flexilis</i>
16004	mountain pine cone beetle	<i>Conophthorus monicolae</i>
16005	ponderosa pine cone beetle	<i>Conophthorus ponderosae</i>
16006	Monterey pine cone beetle	<i>Conophthorus radiatae</i>
16007	red pine cone beetle	<i>Conophthorus resinosae</i>
16008	white pine cone beetle	<i>Conophthorus coniperda</i>
16009	black walnut curculio	<i>Conotrachelus retentus</i>
16010	Douglas-fir cone midge	<i>Contarinia oregonensis</i>
16011	cone scale midge	<i>Contarinia washingtonensis</i>
16012	pecan	<i>Curculio spp.</i>
16013	Caroline fruitfly	<i>Dacus frauenfeldi</i>
16014	spruce bud midge	<i>Dasineura swainei</i>
16015	fir coneworm	<i>Dioryctria abietivorella</i>
16016	southern pine cone worm	<i>Dioryctria amatella</i>
16017	pine coneworm	<i>Dioryctria auranticella</i>
16018	loblolly pine cone worm	<i>Dioryctria merkeli</i>
16019	ponderosa twig moth	<i>Dioryctria ponderosae</i>
16020	unknown	<i>Dioryctria pseudotsugella</i>

Code	Common Name	Scientific Name
16021	Dioryctria moths	<i>Dioryctria spp.</i>
16022	lodgepole cone moth	<i>Eucosma rescissoriana</i>
16023	seed chalcid	<i>Eurytomidae</i>
16024	slash pine flower thrips	<i>Gnophothrips fuscus</i>
16025	cone maggot	<i>Hylemya anthracina</i>
16026	longleaf pine seed worm or moth	<i>Laspeyresia ingens</i>
16027	ponderosa pine seed worm or moth	<i>Laspeyresia piperana</i>
16028	spruce seed moth	<i>Laspeyresia youngana</i>
16029	boxelder bug	<i>Leptocoris trivittatus</i>
16030	leaffooted pine seed bug	<i>Leptoglossus corculus</i>
16031	western conifer seed bug	<i>Leptoglossus occidentalis</i>
16032	hollyhock thrips	<i>Liothrips varicornis</i>
16033	unknown	<i>Magastigmus lasiocarpae</i>
16034	spruce seed chalcid	<i>Magastigmus piceae</i>
16035	ponderosa pine seed chalcid	<i>Megastigmus albifrons</i>
16036	fir seed chalcid	<i>Megastigmus pinus</i>
16037	Douglas-fir seed chalcid	<i>Megastigmus spermotrophs</i>
16038	yellow poplar weevil	<i>Odontopus calceatus</i>
16039	fruitpiercing moth	<i>Othreis fullonia</i>
16040	roundheaded cone borer	<i>Paratimia conicola</i>
16041	mango shoot caterpillar	<i>Penicillaria jocosatrix</i>
16042	coneworm	<i>Phycitidae</i>
16043	harvester ants	<i>Pogonomyrmex spp.</i>
16044	citrus flower moth	<i>Prays citri</i>
16045	fir cone maggot	<i>Strobilomyia abietis</i>
16046	spruce cone maggot	<i>Strobilomyia anthracina</i>
16047	shieldbacked pine seed bug	<i>Tetyra bipunctata</i>
16048	coneworm	<i>Hylemia spp.</i>
16049	prairie tent caterpillar	<i>Malacosoma lutescens</i>
16050	jack pine tip beetle	<i>Conophthorus banksianae</i>
17000	Gallmaker Insects	
17001	birch budgall mite	<i>Aceria rudis</i>
17002	eastern spruce gall adelgid	<i>Adelges abietis</i>
17003	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>
17004	horned oak gall	<i>Callirhytis cornigera</i>
17005	gouty oak gall	<i>Callirhytis quercuspunctata</i>
17006	gall midge	<i>Cecidomyiidae</i>

Code	Common Name	Scientific Name
17007	Douglas-fir needle gall midge	<i>Contarinia pseudotsugae</i>
17008	gall mite	<i>Eriophyidae</i>
17009	spruce gall midge	<i>Mayetiola piceae</i>
17010	hackberry nipplegall maker	<i>Pachypsylla celtidismamma</i>
17011	balsam gall midge	<i>Paradiplosis tumifex</i>
17012	leaf stem gall adelgid	<i>Phylloxera caryaecaulis</i>
17013	gall aphid	<i>Phylloxeridae</i>
17014	alder gall mite	<i>Phytoptus laevis</i>
17015	psyllid	<i>Psyllidae</i>
17016	sugarberry psyllid	<i>Tetragonocephela flava</i>
17017	mountain apple psyllid	<i>Trioza vitiensis</i>
17018	gouty pitch midge	<i>Cedidomyia piniinopsis</i>
17019	spider mites	<i>Oligonychus spp.</i>
17020	cypress gall midges	<i>Taxodiomyia spp.</i>
17021	jumping oak gall wasp	<i>Neuroterus saltatorius</i>
18000	Insect Predators	
18001	lacewing	
18002	blackbellied clerid	<i>Enoclerus lecontei</i>
18003	redbellied clerid	<i>Enoclerus sphegeus</i>
18004	unknown	<i>Formica rufa</i>
18005	western yellowjacket	<i>Vespula pennsylvanica</i>
19000	General Diseases	
20000	Biotic Damage	
20001	damping off	
20002	gray mold	<i>Botrytis cinerea</i>
20003	Cassytha	<i>Cassytha filiformis</i>
20004	hemlock fluting	
21000	Root/Butt Diseases	
21001	Armillaria root disease	<i>Armillaria spp.</i>
21002	yellow stringy rot	<i>Corticium galactimum</i>
21003	Cylindrocladium root disease	<i>Cylindrocladium spp.</i>
21004	brown crumbly rot	<i>Fomitopsis pinicola</i>
21005	black root rot of pine	<i>Fusarium oxysporum</i>
21006	Fusarium root rot	<i>Fusarium spp.</i>

Code	Common Name	Scientific Name
21007	white mottled rot	<i>Ganoderma applanatum</i>
21008	Ganoderma rot of hardwoods	<i>Ganoderma lucidum</i>
21009	Ganoderma rot of conifers	<i>Ganoderma tsugae</i>
21010	annosus root disease	<i>Heterobasidion annosum</i>
21011	circinatus root rot	<i>Inonotus circinatus</i>
21012	tomentosus root disease	<i>Inonotus tomentosus</i>
21013	charcoal root rot	<i>Macrophomina phaseolina</i>
21014	black stain root disease	<i>Ophiostoma wageneri</i>
21015	Schweinitzii butt rot	<i>Phaeolus schweinitzii</i>
21016	flame tree root disease	<i>Phellinus noxious</i>
21017	laminated root rot	<i>Phellinus weiri</i>
21018	Phytophthora root rot	<i>Phytophthora cinnamomi</i>
21019	littleleaf disease	<i>Phytophthora cinnamomi/Pythium</i>
21020	Port-Orford-Cedar root disease	<i>Phytophthora lateralis</i>
21022	Pythium root rot	<i>Pythium spp.</i>
21023	procera root disease of conifers	<i>Verticicladiella procera</i>
21024	crown gall	<i>Agrobacterium tumefaciens</i>
21025	borealis conk	<i>Climacocystis borealis</i>
21026	yellow pitted rot	<i>Hericium abietis</i>
21027	brown cubical rot	<i>Laetiporus sulphureus</i>
21028	sudden oak death	<i>Phytophthora ramorum</i>
22000	Stem Decays/Cankers	
22001	heart rot	
22002	stem rot	
22003	sap rot	
22004	slime flux	
22005	virus	
22006	black knot of cherry	<i>Apiosporina morbosa</i>
22007	Atropellis canker	<i>Atropellis piniphila</i>
22008	Siberian elm canker	<i>Botryodiplodia hypoderma</i>
22009	Botryosphaeria canker	<i>Botryosphaeria ribis</i>
22010	black rot fungus	<i>Botryosphaeria stevensii</i>
22011	Caliciopsis canker	<i>Caliciopsis pinea</i>
22012	black canker of aspen	<i>Ceratocystis fimbriata</i>
22013	sycamore canker stain	<i>Ceratocystis fimbriata f.sp. platanini</i>
22023	chestnut blight	<i>Cryphonectria parasitica</i>
22024	gray-brown saprot	<i>Cryptoporus volvatus</i>

Code	Common Name	Scientific Name
22025	Cryptosphaeria canker of aspen	<i>Cryptosphaeria populin</i>
22026	Cytospora canker of fir	<i>Cytospora abietis</i>
22027	western red rot	<i>Dichomitus squalens</i>
22028	rust-red stringy rot	<i>Echinodontium tinctorium</i>
22029	sooty-bark canker	<i>Encoelia pruinosa</i>
22030	Eutypella canker	<i>Eutypella parasitica</i>
22031	Fusarium cortical stem rot	<i>Fusarium avenaceum</i>
22032	pitch canker	<i>Fusarium subglutinans</i>
22033	Fusicoccum canker	<i>Fusicoccum spp.</i>
22034	Scleroderris canker	<i>Gremmeniella abietina</i>
22035	amelanchier rust	<i>Gymnosporangium harknessianum</i>
22036	cedar apple rust	<i>Gymnosporangium juniperi-virginianae</i>
22037	Hypoxylon canker of oak	<i>Hypoxylon atropunctatum</i>
22038	Hypoxylon canker of aspen	<i>Hypoxylon mammatum</i>
22039	canker rot of oak	<i>Inonotus hispidus</i>
22040	sterile conk trunk rot of birch	<i>Inonotus obliquus</i>
22041	European larch canker	<i>Lachnellula willkommii</i>
22042	beech bark disease	<i>Nectria coccinea</i>
22043	Nectria canker	<i>Nectria galligena</i>
22044	ash heart rot	<i>Pereniporia fraxinophila</i>
22047	red ring rot	<i>Phellinus pini</i>
22048	aspen trunk rot	<i>Phellinus tremulae</i>
22049	stem decay of black walnut	<i>Phellinus weiri</i>
22050	Phomopsis canker	<i>Phomopsis occulta</i>
22051	Phomopsis canker	<i>Phomopsis spp.</i>
22052	leyland cypress canker	<i>Seiridium cardinale</i>
22053	butternut canker	<i>Sirococcus clavigignenti-jugl.</i>
22054	maple canker	<i>Steganoспорium spp.</i>
22055	Thyronectria canker	<i>Thyronectria austro-americana</i>
22056	citrus canker	<i>Xanthomonas citri</i>
22057	Cytospora canker of aspen	<i>Cytospora chrysosperma</i>
22058	Dothichiza canker	<i>Dothichiza populae</i>
22059	red belt fungus	<i>Fomitopsis pinicola</i>
22060	Leucocytospora canker of spruce	<i>Leucocytospora kunzei</i>
22061	sooty bark canker	<i>Phitalis singulare</i>
22062	brown heartrot	<i>Fomitopsis Officinalis</i>
22063	unknown	<i>Coniophora puteana</i>
22064	tinder fungus	<i>Fomes fomentarius</i>

Code	Common Name	Scientific Name
22065	purple conk	<i>Hirschioporus abietinus</i>
22066	pinyon black stain	<i>Leptographium wagnerii</i>
22067	unknown	<i>Phellinus hartigii</i>
22068	false tinder fungus	<i>Phellinus igniarius</i>
22069	robustus conk	<i>Phellinus robustus</i>
22070	yellow cap fungus	<i>Pholiota spp.</i>
22071	oyster mushroom	<i>Pleurotus ostreatus</i>
22072	white ring rot	<i>Poria albipellucida</i>
22073	hemlock canker	<i>Xenomeris abietis</i>
22074	cedar brown pocket rot	<i>Poria sericeomollis</i>
22075	Lachnellula canker	<i>Lachnellula flavovirens</i>
22076	strumella canker	<i>Strumella coryneoides</i>
22077	phomopsis blight	<i>Phomopsis juniperovora</i>
22078	fusarium canker of yellow poplar	<i>Fusarium solani</i>
22079	sterile conk of maple and beech	<i>Inonotus glomeratus</i>
22080	canker of spruce	<i>Aleurodiscus spp.</i>
22081	birch conk	<i>Piptoporus betulinus</i>
22082	canker	<i>Discocainia treleasei</i>
23000	Parasitic/Epiphytic Plants	
23001	mistletoe	
23002	parasitic plants	
23003	vine damage	
23005	white fir dwarf mistletoe	<i>Arceuthobium abietinum f. sp. concoloris</i>
23006	lodgepole pine dwarf mistletoe	<i>Arceuthobium americanum</i>
23007	Apache dwarf mistletoe	<i>Arceuthobium apachecum</i>
23008	western dwarf mistletoe	<i>Arceuthobium campylopodum</i>
23009	limber pine dwarf mistletoe	<i>Arceuthobium cyanocarpum</i>
23010	pinyon dwarf mistletoe	<i>Arceuthobium divaricatum</i>
23011	Douglas-fir dwarf mistletoe	<i>Arceuthobium douglasii</i>
23012	Chihuahua pine dwarf mistletoe	<i>Arceuthobium gillii</i>
23013	larch dwarf mistletoe	<i>Arceuthobium laricis</i>
23014	western spruce dwarf mistletoe	<i>Arceuthobium microcarpum</i>
23015	eastern dwarf mistletoe	<i>Arceuthobium pusillum</i>
23016	hemlock dwarf mistletoe	<i>Arceuthobium tsugense</i>
23017	southwestern dwarf mistletoe	<i>Arceuthobium vaginatum subsp. <i>cryptopodium</i></i>
23018	dodder	<i>Cuscuta spp.</i>
23019	white fir mistletoe	<i>Phoradendron bolleanum subsp. <i>pauciflorum</i></i>

Code	Common Name	Scientific Name
23020	true mistletoe (other)	
23021	red fir dwarf mistletoe	<i>Arceuthobium abietinum f. sp. magnifica</i>
23022	juniper true mistletoe	<i>Phoradendron juniperum</i>
24000	Decline Complexes/Dieback/Wilts	
24001	Alaska-yellow cedar decline	
24002	Norfolk Island pine decline	
24003	Stillwell's syndrome	
24004	ash decline/yellows	
24005	birch dieback	
24006	cadang-cadang yellow mottle virus	
24007	complex	
24008	decline	
24009	fall hardwood defoliator complex	
24010	joga decline	
24011	larch decline	
24012	looper; abiotic complex	
24013	maple decline	
24014	oak decline	
24015	pingelap disease	
24016	sprout dieback	
24017	true fir pest complex	
24018	western X disease	
24019	pinewood nematode	<i>Bursaphelenchus xylophilus</i>
24020	sapstreak disease of sugar maple	<i>Ceratocystis coerulescens</i>
24021	oak wilt	<i>Ceratocystis fagacearum</i>
24022	Dutch elm disease	<i>Ceratocystis ulmi</i>
24023	bacterial wetwood	<i>Erwinia nimipressuralis</i>
24024	mimosa wilt	<i>Fusarium oxysporum f. sp. perniciosum</i>
24025	Verticillium wilt	<i>Verticillium albo-atrum</i>
24026	unknown	<i>Xylella fastidiosa</i>
24027	wetwood	
24028	hemlock decline	
24029	Pacific madrone decline	
24030	elm phloem necrosis	<i>Mycoplasma</i>
25000	Foliage diseases	
25001	blight	

Code	Common Name	Scientific Name
25002	broom rust	
25003	juniper blights	
25004	leaf spots	
25005	needlecast	
25006	powdery mildew	
25007	tobacco mosaic virus	
25008	tobacco ringspot virus of ash	
25009	true fir needlecast	
25010	sycamore anthracnose	<i>Apiognomonia veneta</i>
25011	Cercospora blight of juniper	<i>Cercospora sequoiae</i>
25013	large-spored spruce-laborador tea rust	<i>Chrysomyxa ledicola</i>
25014	ink spot of aspen	<i>Ciborinia whetzelii</i>
25015	pine needle rust	<i>Coleosporium spp.</i>
25016	anthracnose on Russian olive	<i>Colletotrichum spp.</i>
25017	Coronado limb rust	<i>Cronartium arizonicum</i>
25018	leaf shothole	<i>Cylindrosporium spp.</i>
25019	cedar leaf blight	<i>Didymascella thujina</i>
25020	dogwood anthracnose	<i>Discula spp.</i>
25021	mango scab	<i>Elsinoe magiferae</i>
25022	Elytroderma disease	<i>Elytroderma deformans</i>
25023	fire blight	<i>Erwinia amylovora</i>
25024	walnut anthracnose	<i>Gnomonia leptostyla</i>
25025	anthracnose	<i>Gnomonia spp.</i>
25027	brown felt blight	<i>Herpotrichia juniperi</i>
25028	larch needle blight	<i>Hypodermella laricis</i>
25029	hardwood anthracnose	<i>Kabatiella apocrypta</i>
25030	cone damage	<i>Lasiodiplodia spp.</i>
25031	spruce needle cast	<i>Lirula macrospora</i>
25032	fir needle cast	<i>Lirula spp.</i>
25033	white pine needle cast	<i>Lophodermella arcuata</i>
25034	Lophodermella needle cast	<i>Lophodermella spp.</i>
25035	Lophodermium needle cast	<i>Lophodermium spp.</i>
25036	Marssonina blight	<i>Marssonina populi</i>
25037	Melampsora rusts	<i>Melampsora medusae</i>
25039	larch needle cast	<i>Meria laricis</i>
25040	Dothistroma needle blight	<i>Mycosphaerella pini</i>
25041	brown felt blight of pines	<i>Neopeckia coulteri</i>
25042	snow blight	<i>Phacidium abietis</i>

Code	Common Name	Scientific Name
25043	Swiss needle cast	<i>Phaeocryptopus gaumannii</i>
25044	Phoma blight	<i>Phoma spp.</i>
25045	Phyllosticta leaf spot	<i>Phyllosticta spp.</i>
25046	bud rot	<i>Phytophthora palmivora</i>
25047	Ploioderma needle cast	<i>Ploioderma spp.</i>
25048	ash rust	<i>Puccinia sparganioides</i>
25049	fir needle rust	<i>Pucciniastrum spp.</i>
25050	Douglas-fir needle cast	<i>Rhabdocline spp.</i>
25051	Rhizoctonia needle blight	<i>Rhizoctonia spp.</i>
25052	Rhizophaeria needle cast	<i>Rhizophaeria spp.</i>
25053	Rhizopus rot	<i>Rhizopus artocarpi</i>
25054	brown spot needle blight	<i>Scirrhia acicola</i>
25055	Septoria leaf spot	<i>Septoria alnifolia</i>
25056	Septoria leaf spot and canker	<i>Septoria musiva</i>
25057	Sirococcus tip blight	<i>Sirococcus conigenus</i>
25058	Diplodia blight	<i>Sphaeropsis sapinea</i>
25059	leaf blister of oak	<i>Taphrina caerulescens</i>
25060	Venturia leaf blight of maple	<i>Venturia acerina</i>
25061	shepherd's crook	<i>Venturia tremulae</i>
25062	Dothistroma needle blight	<i>Dothistroma septospora</i>
25063	yellow-cedar shoot blight	<i>Apostrasseria spp.</i>
25064	broom rust	<i>Chrysomyxa arctostaphyli</i>
25065	spruce needle rust	<i>Chrysomyxa weiri</i>
25066	cedar leave blight	<i>Gymnosporangium nootkatense</i>
25067	spruce needle cast	<i>Lophodermium picea</i>
25068	hardwood leaf rusts	<i>Melampsora spp.</i>
25070	hemlock needle rust	<i>Pucciniastrum vaccinii</i>
25071	spruce needle cast	<i>Rhizosphaera pini</i>
25072	sirococcus shoot blight	<i>Sirococcus strobilinus</i>
25073	shephards crook	<i>Venturia populina</i>
25074	Delphinella shoot blight	<i>Delphinella abietis</i>
26000	Stem Rusts	
26001	white pine blister rust	<i>Cronartium ribicola</i>
26002	western gall rust	<i>Peridermium harknessii</i>
26003	stalactiform blister rust	<i>Cronartium coleosporioides</i>
26004	comandra blister rust	<i>Cronartium comandrae</i>
26005	pinyon blister rust	<i>Cronartium occidentale</i>

Code	Common Name	Scientific Name
26006	eastern gall rust	<i>Cronartium quercuum</i>
26007	gall rust of jack pine	<i>Cronartium quercuum f. sp. banksignae</i>
26008	gall rust of shortleaf pine	<i>Cronartium quercuum f. sp. echinatae</i>
26009	fusiform rust	<i>Cronartium quercuum f. sp. fusiforme</i>
26010	gall rust of virginia pine	<i>Cronartium quercuum f. sp. virginianae</i>
26011	Bethuli rust	<i>Peridermium bethuli</i>
26012	limb rust	<i>Peridermium filamentosum</i>
26013	southern cone rust	<i>Cronartium strobilinum</i>
27000	Broom Rusts	
27001	spruce broom rust	<i>Chrysomyxa arctostaphyli</i>
27002	Incense cedar broom rust	<i>Gymnosporangium libocedri</i>
27003	juniper broom rust	<i>Gymnosporangium nidus-avis</i>
27004	fir broom rust	<i>Melampsorella caryophyllacearum</i>
30000	Fire	
41000	Wild Animals	
41001	bear	
41002	beaver	
41003	big game (deer)	
41004	mice or voles	
41005	pocket gophers	
41006	porcupines	
41007	rabbits or hares	
41008	sapsucker	
41009	squirrels	
41010	woodpeckers	
41011	moose	
42000	Domestic Animals	
42001	cattle	
42002	goats	
42003	horses	
42004	sheep	
50000	Abiotic Damage	
50001	air pollutants	

Code	Common Name	Scientific Name
50002	chemical	
50003	drought	
50004	flooding/high water	
50005	frost	
50006	hail	
50007	heat	
50008	lightning	
50009	nutrient imbalances	
50010	radiation	
50011	snow/ice	
50012	wild-fire	
50013	wind-tornado	
50014	winter injury	
50015	avalanche	
50016	mud-land slide	
50017	volcano	
60000	Competition	
70000	Human Activities	
70001	herbicides	
70002	human caused fire	
70003	imbedded objects	
70004	improper planting technique	
70005	land clearing	
70006	land use conversion	
70007	logging damage	
70008	mechanical	
70009	pesticides	
70010	roads	
70011	soil compaction	
70012	suppression	
70013	vehicle damage	
70014	road salt	
71000	Harvest	

Code	Common Name	Scientific Name
80000	Multi-Damage (Insect/Disease)	
80001	aspen defoliation	
80002	subalpine fir mortality	
80003	five-needle pine decline	
80004	pinion pine mortality	
90000	Unknown	
90001	broken top	
90002	dead top	
90003	limby-wolf tree	
90004	forked top	
90005	forked below merch top	
90006	crook or sweep	
90007	checks, bole cracks	
90008	foliage discoloration	
90009	mortality	
90010	dieback	
99999	No Data	

Appendix F Host Tree Species Codes

The table in this appendix contains the list of host tree species and the associated codes to be used in the *host1*, *host2*, and *host3* fields of the damage coverages. These codes are taken from the EMAP Forest Health Monitoring Manual, Appendix A, Rev. No. 0, April, 1995. There are east and west versions of this manual. This list combines the east and west versions into a single list. For Forest Health Monitoring aerial survey purposes, some codes have been added. These added codes are noted in the following list with an asterisk (*) and may be added to the FHM manual in a future release. The contents of this list is available in digital form (.dbf) elsewhere on this web site.

Code	Common Name	Genus	Species
001	hardwoods *		
002	softwoods *		
003	hardwoods/softwoods *		
010	fir	Abies	spp.
011	Pacific silver fir	Abies	amabilis
012	balsam fir	Abies	balsamea
014	bristlecone fir	Abies	bracteata
015	white fir	Abies	concolor
016	Fraser fir	Abies	fraseri
017	grand fir	Abies	grandis
018	corkbark fir	Abies	lasiocarpa var. arizonica
019	subalpine fir	Abies	lasiocarpa
020	California red fir	Abies	magnifica var. magnifica
021	Shasta red fir	Abies	magnifica var. shastensis
022	noble fir	Abies	procera
041	Port-Orford-cedar	Chamaecyparis	lawsoniana
042	Alaska yellow-cedar	Chamaecyparis	nootkatensis
043	Atlantic white-cedar	Chamaecyparis	thyoides
050	cypress	Cupressus	spp.
051	Arizona cypress	Cupressus	arizonica
052	Baker cypress	Cupressus	bakeri
053	Tecate cypress	Cupressus	forbesii
054	Monterey cypress	Cupressus	macrocarpa
055	Sargent cypress	Cupressus	sargentii
057	redcedar; juniper	Juniperus	spp.
058	Pinchot juniper	Juniperis	pinchotii
059	redberry juniper	Juniperis	erythrocarpa
061	Ashe juniper	Juniperus	ashei
062	California juniper	Juniperis	californica
063	alligator juniper	Juniperis	deppeana
064	western juniper	Juniperis	occidentalis
065	Utah juniper	Juniperis	osteosperma
066	Rocky Mountain juniper	Juniperis	scopulorum
067	southern redcedar	Juniperus	silicicola
068	eastern redcedar	Juniperus	virginiana

Code	Common Name	Genus	Species
069	oneseed juniper	<i>Juniperis</i>	<i>monosperma</i>
070	larch (introduced)	<i>Larix</i>	spp.
071	tamarack	<i>Larix</i>	<i>laricina</i>
072	subalpine larch	<i>Larix</i>	<i>lyallii</i>
073	western larch	<i>Larix</i>	<i>occidentalis</i>
081	incense-cedar	<i>Libocedrus</i>	<i>decurrens</i>
090	spruce	<i>Picea</i>	spp.
091	Norway spruce	<i>Picea</i>	<i>abies</i>
092	Brewer spruce	<i>Picea</i>	<i>brewerana</i>
093	Engelmann spruce	<i>Picea</i>	<i>engelmannii</i>
094	white spruce	<i>Picea</i>	<i>glauca</i>
095	black spruce	<i>Picea</i>	<i>mariana</i>
096	blue spruce	<i>Picea</i>	<i>pungens</i>
097	red spruce	<i>Picea</i>	<i>rubens</i>
098	Sitka spruce	<i>Picea</i>	<i>sitchensis</i>
099	Lutz spruce	<i>Picea</i>	<i>glauca</i> var. <i>sitchensis</i>
101	whitebark pine	<i>Pinus</i>	<i>albicaulis</i>
102	bristlecone pine	<i>Pinus</i>	<i>aristata</i>
103	knobcone pine	<i>Pinus</i>	<i>attenuata</i>
104	foxtail pine	<i>Pinus</i>	<i>balfouriana</i>
105	jack pine	<i>Pinus</i>	<i>banksiana</i>
106	common pinyon	<i>Pinus</i>	<i>edulis</i>
107	sand pine	<i>Pinus</i>	<i>clausa</i>
108	lodgepole pine	<i>Pinus</i>	<i>contorta</i>
109	Coulter pine	<i>Pinus</i>	<i>coulteri</i>
110	shortleaf pine	<i>Pinus</i>	<i>echinata</i>
111	slash pine	<i>Pinus</i>	<i>elliottii</i>
112	Apache pine	<i>Pinus</i>	<i>engelmannii</i>
113	limber pine	<i>Pinus</i>	<i>flexilis</i> var. <i>reflexa</i>
114	southwestern white pine	<i>Pinus</i>	<i>strobiformis</i>
115	spruce pine	<i>Pinus</i>	<i>glabra</i>
116	Jeffrey pine	<i>Pinus</i>	<i>jeffreyi</i>
117	sugar pine	<i>Pinus</i>	<i>lambertiana</i>
118	Chihuahuan pine	<i>Pinus</i>	<i>leiophylla</i>
119	western white pine	<i>Pinus</i>	<i>monticola</i>
120	bishop pine	<i>Pinus</i>	<i>muricata</i>

Code	Common Name	Genus	Species
121	longleaf pine	Pinus	palustris
122	ponderosa pine	Pinus	ponderosa
123	Table Mountain pine	Pinus	pungens
124	Monterey pine	Pinus	radiata
125	red pine	Pinus	resinosa
126	pitch pine	Pinus	rigida
127	grey pine	Pinus	sabiniana
128	pond pine	Pinus	serotina
129	eastern white pine	Pinus	strobus
130	Scotch pine	Pinus	sylvestris
131	loblolly pine	Pinus	taeda
132	Virginia pine	Pinus	virginiana
133	singleleaf pinyon	Pinus	monophylla
134	border pinyon	Pinus	discolor
135	Arizona pine	Pinus	ponderosa var. arizonica
136	Austrian pine	Pinus	nigra
137	Washoe pine	Pinus	washoensis
138	four-needle pine	Pinus	quadrifolia
139	Torrey pine	Pinus	torreyana
140	Mexican pinyon pine	Pinus	cembroides
201	bigcone Douglas-fir	Pseudotsuga	macrocarpa
202	Douglas-fir	Pseudotsuga	menziesii
211	redwood	Sequoia	sempervirens
212	giant sequoia	Sequoiadendron	giganteum
221	baldcypress	Taxodium	distichum
222	pondcypress	Taxodium	distichum var. nutans
231	Pacific yew	Taxus	brevifolia
241	northern white-cedar	Thuja	occidentalis
242	western redcedar	Thuja	plicata
251	California torreya	Torreya	californica
260	hemlock	Tsuga	spp.
261	eastern hemlock	Tsuga	canadensis
262	Carolina hemlock	Tsuga	caroliniana
263	western hemlock	Tsuga	heterophylla
264	mountain hemlock	Tsuga	mertensiana
310	maple	Acer	spp.

Code	Common Name	Genus	Species
311	Florida maple	Acer	<i>barbatum</i>
312	bigleaf maple	Acer	<i>macrophyllum</i>
313	boxelder	Acer	<i>negundo</i>
314	black maple	Acer	<i>nigrum</i>
315	striped maple	Acer	<i>pensylvanicum</i>
316	red maple	Acer	<i>rubrum</i>
317	silver maple	Acer	<i>saccharinum</i>
318	sugar maple	Acer	<i>saccharum</i>
319	mountain maple	Acer	<i>spicatum</i>
321	Rocky Mountain maple	Acer	<i>glabrum</i>
322	bigtooth maple	Acer	<i>grandidentatum</i>
330	buckeye; horsechestnut	Aesculus	spp.
331	horsechestnut	Aesculus	<i>glabra</i>
332	yellow buckeye	Aesculus	<i>octandra</i>
333	California buckeye	Aesculus	<i>californica</i>
341	ailanthus	Ailanthus	<i>altissima</i>
351	red alder	Alnus	<i>rubra</i>
352	white alder	Alnus	<i>rhombifolia</i>
355	European alder	Alnus	<i>glutinosa</i>
356	serviceberry	Amelanchier	<i>arborea</i>
361	Pacific madrone	Arbutus	<i>menziesii</i>
367	pawpaw	Asimina	<i>triloba</i>
370	birch	Betula	spp.
371	yellow birch	Betula	<i>alleghaniensis</i>
372	sweet birch	Betula	<i>lenta</i>
373	river birch	Betula	<i>nigra</i>
375	paper birch	Betula	<i>papyrifera</i>
376	western paper birch	Betula	<i>papyrifera</i> var. <i>commutata</i>
377	Alaska paper birch	Betula	<i>papyrifera</i> var. <i>neoalaskana</i>
378	northwestern paper birch	Betula	<i>papyrifera</i> var. <i>subcordata</i>
379	gray birch	Betula	<i>populifolia</i>
381	chittamwood; gum bumelia	Bumelia	<i>lanuginosa</i>
391	American hornbeam; musclewood	Carpinus	<i>caroliniana</i>
400	hickory	Carya	spp.
401	water hickory	Carya	<i>aquatica</i>
402	bitternut hickory	Carya	<i>cordiformis</i>

Code	Common Name	Genus	Species
403	pignut hickory	Carya	glabra
404	pecan	Carya	illinoensis
405	shellbark hickory	Carya	laciniosa
407	shagbark hickory	Carya	ovata
408	black hickory	Carya	texana
409	mockernut hickory	Carya	tomentosa
421	American chestnut	Castanea	dentata
422	Allegheny chinkapin	Castanea	pumila
423	Ozark chinkapin	Castanea	ozarkensis
431	golden chinkapin	Castanopsis	chrysophylla
450	catalpa	Catalpa	spp.
451	southern catalpa	Catalpa	bignonioides
452	northern catalpa	Catalpa	speciosa
460	hackberry	Celtis	spp.
461	sugarberry	Celtis	laevigata
462	hackberry	Celtis	occidentalis
463	netleaf hackberry	Celtis	reticulata
471	eastern redbud	Cercis	canadensis
475	curlleaf mountain-mahogany	Cercocarpus	ledifolius
476	alderleaf mountain-mahogany	Cercocarpus	montanus
477	hairy mountain-mahogany	Cercocarpus	breviflorus
481	yellowwood cladrastis	Cladrastis	kentukea
491	flowering dogwood	Cornus	florida
492	Pacific dogwood	Cornus	nuttallii
500	hawthorn	Crataegus	spp.
501	hawthorn (crus-galli)	Crataegus	crus-galli
502	hawthorn (mollis)	Crataegus	mollis
510	eucalyptus	Eucalyptus	spp.
521	common persimmon	Diospyros	virginiana
531	American beech	Fagus	grandifolia
540	ash	Fraxinus	spp.
541	white ash	Fraxinus	americana
542	Oregon ash	Fraxinus	latifolia
543	black ash	Fraxinus	nigra
544	green ash	Fraxinus	pennsylvanica
545	pumpkin ash	Fraxinus	profunda

Code	Common Name	Genus	Species
546	blue ash	Fraxinus	quadrangulata
547	velvet ash	Fraxinus	velutina
551	waterlocust	Gleditsia	aquatica
552	honeylocust	Gleditsia	triacanthos
555	loblolly-bay	Gordonia	lasianthus
571	Kentucky coffeetree	Gymnocladus	dioicus
580	silverbell	Halesia	spp.
591	American holly	Ilex	opaca
600	walnut	Juglans	spp.
601	butternut	Juglans	cinerea
602	black walnut	Juglans	nigra
603	California black walnut	Juglans	hindsii
604	southern California black walnut	Juglans	californica
605	Texas walnut	Juglans	microcarpa
611	sweetgum	Liquidambar	styraciflua
621	yellow-poplar	Liriodendron	tulipifera
631	tanoak	Lithocarpus	densiflorus
641	Osage-orange	Maclura	pomifera
650	magnolia	Magnolia	spp.
651	cuckertree	Magnolia	acuminata
652	southern magnolia	Magnolia	grandiflora
653	sweetbay	Magnolia	virginiana
654	bigleaf magnolia	Magnolia	macrophylla
660	apple	Malus	spp.
661	Oregon crab apple	Malus	fusca
680	mulberry	Morus	spp.
681	white mulberry	Morus	alba
682	red mulberry	Morus	rubra
691	water tupelo	Nyssa	aquatica
692	Ogeechee tupelo	Nyssa	ogeche
693	blackgum	Nyssa	sylvatica
694	swamp tupelo	Nyssa	sylvatica var. biflora
701	eastern hophornbeam, ironwood	Ostrya	virginiana
711	sourwood	Oxydendrum	arboreum
712	paulownia, empress-tree	Paulownia	tomentosa
715	yellow paloverde	Parkinsonia	microphylla

Code	Common Name	Genus	Species
716	blue paloverde	Parkinsonia	florida
717	Jerusalem thorn	Parkinsonia	aculeata
721	redbay	Persea	borbonia
722	water elm, planer tree	Planera	acquatica
730	California sycamore	Platanus	californica
731	sycamore	Platanus	occidentalis
740	cottonwood, poplar	Populus	spp.
741	balsam popular	Populus	balsamifera
742	eastern cottonwood	Populus	deltoides
743	bigtooth aspen	Populus	grandidentata
744	swamp cottonwood	Populus	heterophylla
745	plains cottonwood	Populus	sargentii
746	quaking aspen	Populus	tremuloides
747	black cottonwood	Populus	trichocarpa
748	Fremont poplar	Populus	fremontii
749	narrowleaf cottonwood	Populus	angustifolia
752	silver poplar	Populus	alba
755	mesquite	Prosopsis	sp.
756	western honey mesquite	Prosopsis	glandulosa var. torreyana
757	velvet mesquite	Prosopsis	velutina var. velutina
758	screwbean mesquite	Prosopsis	pubescens
760	cherry; plum	Prunus	spp.
761	pin cherry	Prunus	pensylvanica
762	black cherry	Prunus	serotina
763	chokecherry	Prunus	virginiana
765	Canada plum	Prunus	nigra
766	wild plum	Prunus	americana
768	bitter cherry	Prunus	emarginata
800	oak(deciduous)	Quercus	spp.
801	coast live oak	Quercus	agrifolia
802	white oak	Quercus	alba
803	Arizona white oak; gray oak	Quercus	arizonica
804	swamp white oak	Quercus	bicolor
805	canyon live oak	Quercus	chrysolepis
806	scarlet oak	Quercus	coccinea
807	blue oak	Quercus	douglasii

Code	Common Name	Genus	Species
808	Durand oak	Quercus	<i>durandii</i>
809	northern pin oak	Quercus	<i>ellipsoidalis</i>
810	Emery oak	Quercus	<i>emoryi</i>
811	Engelmann oak	Quercus	<i>engelmannii</i>
812	southern red oak	Quercus	<i>falcata</i> var. <i>falcata</i>
813	cherrybark oak; swamp red oak	Quercus	<i>pagodaefolia</i>
814	Gambel oak	Quercus	<i>gambelii</i>
815	Oregon white oak	Quercus	<i>garryana</i>
816	bear oak; scrub oak	Quercus	<i>ilicifolia</i>
817	shingle oak	Quercus	<i>imbricaria</i>
818	California black oak	Quercus	<i>kelloggii</i>
819	turkey oak	Quercus	<i>laevis</i>
820	laurel oak	Quercus	<i>laurifolia</i>
821	valley oak	Quercus	<i>lobata</i>
822	overcup oak	Quercus	<i>lyrata</i>
823	bur oak	Quercus	<i>macrocarpa</i>
824	blackjack oak	Quercus	<i>marilandica</i>
825	swamp chestnut oak	Quercus	<i>michauxii</i>
826	chinkapin oak	Quercus	<i>muehlenbergii</i>
827	water oak	Quercus	<i>nigra</i>
828	Nuttall oak	Quercus	<i>nuttallii</i>
829	Mexican blue oak	Quercus	<i>oblongifolia</i>
830	pin oak	Quercus	<i>palustris</i>
831	willow oak	Quercus	<i>phellos</i>
832	chestnut oak	Quercus	<i>prinus</i>
833	northern red oak	Quercus	<i>rubra</i>
834	Shumard oak	Quercus	<i>shumardii</i>
835	post oak	Quercus	<i>stellata</i>
836	Delta post oak	Quercus	<i>stellata</i> var. <i>mississippiensis</i>
837	black oak	Quercus	<i>velutina</i>
838	live oak	Quercus	<i>virginiana</i>
839	interior live oak	Quercus	<i>wislizeni</i>
840	dwarf post oak	Quercus	<i>stellata</i> var. <i>stellata</i>
841	dwarf live oak	Quercus	<i>minima</i>
842	bluejack oak	Quercus	<i>incana</i>
843	silverleaf oak	Quercus	<i>hypoleucoides</i>

Code	Common Name	Genus	Species
850	oak (evergreen)	Quercus	spp.
901	black locust	Robinia	pseudoacacia
902	New Mexico locust	Robinia	neomexicana
919	soapberry	Sapindus	drummondii
920	willow	Salix	spp.
921	peachleaf willow	Salix	amygdaloïdes
922	black willow	Salix	nigra
924	Scouler willow	Salix	scoulerana
927	white willow	Salix	alba
931	sassafras	Sassafras	albidum
935	American mountain-ash	Sorbus	americana
936	European mountain-ash	Sorbus	aucuparia
950	basswood	Tilia	spp.
951	American basswood	Tilia	americana
952	white basswood	Tilia	heterophylla
970	elm	Ulmus	spp.
971	winged elm	Ulmus	alata
972	American elm	Ulmus	americana
973	cedar elm	Ulmus	crassifolia
974	Siberian elm	Ulmus	pumila
975	slippery elm	Ulmus	rubra
976	September elm	Ulmus	serotina
977	rock elm	Ulmus	thomasii
981	California-laurel	Umellularia	californica
990	tesota	Olneya	tesota
991	saltcedar	Tamarix	spp.
993	chinaberry	Melia	azedarach
994	Chinese tallowtree	Sapium	sebiferum
995	tung-oil-tree	Aleurites	fordii
996	smoketree	Cotinus	obovatus
997	Russian-olive	Elaeagnus	angustifolia
998	not listed		
999	unknown		

Appendix G Forest Type Codes

The table in this appendix contains the list of forest types and the associated codes to be used in the *for_type1*, *for_type2*, and *for_type3* fields of the damage coverages. These codes are taken from the EMAP Forest Health Monitoring Manual, Appendix B, Rev. No. 0, April, 1995. There are east and west versions of this manual. This list combines the east and west versions into a single list. For Forest Health Monitoring aerial survey purposes, some codes have been added. These added codes are noted in the following list with an astrick (*) and may be added to the FHM manual in a future release. The contents of this list is available in digital form (.dbf) elsewhere on this web site.

Code	Host Forest Type
0000	WHITE/RED/JACK PINE GROUP
0010	Jack pine
0020	Red pine
0030	White pine
0040	White pine/hemlock
0050	Hemlock
0060	Scotch pine
0070	Ponderosa pine
0100	SPRUCE/FIR GROUP
0110	Balsam fir
0120	Black spruce
0130	Red spruce/balsam fir
0140	Northern white-cedar
0150	Tamarack (eastern larch)
0160	White spruce
0170	Norway spruce
0180	Larch (introduced)
0190	Red spruce
0200	LONGLEAF/SLASH PINE GROUP
0210	Longleaf pine
0220	Slash pine
0300	LOBLOLLY/SHORTLEAF PINE GROUP
0310	Loblolly pine
0320	Shortleaf pine
0330	Virginia pine
0340	Sand pine
0350	Eastern redcedar
0360	Pond pine
0370	Spruce pine
0380	Pitch pine
0390	Table-mountain pine
0400	OAK/PINE GROUP
0410	White pine/northern red oak/white ash
0420	Eastern redcedar/hardwood
0430	Longleaf pine/scrub oak

Code	Host Forest Type
0440	Shortleaf pine/oak
0450	Virginia pine/southern red oak
0460	Loblolly pine/hardwood
0470	Slash pine/hardwood
0480	Scarlet oak
0490	Other oak/pine
0500	OAK/HICKORY GROUP
0510	Post, black, or bear oak
0520	Chestnut oak
0530	White oak/red oak/hickory
0540	White oak
0550	Northern red oak
0560	Yellow-poplar/white oak/northern red oak
0562	Sweetgum/yellow-poplar
0564	Yellow-poplar
0570	Southern scrub oak
0580	Black locust
0590	Mixed central hardwoods
0592	Sassafras/persimmon
0594	Central hardwood reverting field
0600	OAK/GUM/CYPRESS GROUP
0610	Swamp chestnut oak/cherrybark oak
0620	Sweetgum/Nuttall oak/willow oak
0630	Sugarberry/American elm/green ash
0650	Overcup oak/water hickory
0660	Atlantic white-cedar
0670	Baldcypress/water tupelo
0680	Sweetbay/swamp tupelo/red maple
0690	Palm/mangrove/other tropical
0692	Mangrove
0694	Palm
0696	Other tropical
0700	ELM/ASH/RED MAPLE GROUP
0710	Black ash/American elm/red maple
0720	River birch/sycamore
0730	Cottonwood

Code	Host Forest Type
0740	Willow
0750	Sycamore/pecan/American elm
0800	MAPLE/BEECH/BIRCH GROUP
0810	Sugar maple/beech/yellow birch
0820	Black cherry
0830	Black walnut
0840	Red maple/northern hardwoods
0850	Red maple/central hardwoods
0880	Northern hardwood reverting field
0890	Mixed northern hardwoods
0900	ASPEN/BIRCH GROUP
0910	Aspen
0920	Paper birch
0930	Gray birch
0998	INDETERMINATE
0999	NONSTOCKED
1200	DOUGLAS-FIR TYPE GROUP
1201	Bigcone Douglas-fir
1202	Douglas-fir
2100	MAJOR PINE TYPE GROUP
2108	Lodgepole pine
2116	Jeffrey pine
2117	Sugar pine
2119	Western white pine
2122	Ponderosa pine
3000	WESTERN FIR-SPRUCE TYPE GROUP
3010	Fir
3011	Pacific silver fir
3014	Bristlecone fir
3015	White fir
3017	Grand fir
3018	Corkbark fir
3019	Subalpine fir
3020	California red fir
3021	Shasta red fir
3022	Noble fir

Code	Host Forest Type
3090	Spruce
3092	Brewer spruce
3093	Engelmann spruce
3094	White spruce
3095	Black spruce
3096	Blue spruce
3097	Spruce-Fir
3099	Lutz spruce
4000	HEMLOCK-SPRUCE TYPE GROUP
4098	Sitka spruce
4242	Western redcedar
4263	Western hemlock
4264	Mountain hemlock
5200	REDWOOD/SEQUOIA TYPE GROUP
5211	Redwood
5212	Giant sequoia
6300	WESTERN HARDWOODS
6310	Maple
6312	Bigleaf maple
6313	Boxelder
6321	Rocky Mountain maple
6322	Bigtooth maple
6333	Buckeye
6350	Alder
6351	Red alder
6352	White alder
6360	Madrone
6361	Pacific madrone
6370	Birch
6375	Paper birch
6376	Western paper birch
6430	Chinkapin
6431	Golden chinkapin
6463	Netleaf hackberry
6475	Curlleaf mountain-mahogany
6476	Alderleaf mountain-mahogany

Code	Host Forest Type
6477	Hairy mountain-mahogany
6492	Pacific dogwood
6510	Eucalyptus
6540	Ash
6542	Oregon ash
6547	Velvet ash
6600	Walnut
6602	Black walnut
6603	California black walnut
6604	Southern california black walnut
6631	Tanoak
6660	Apple
6715	Yellow paloverde
6716	Blue paloverde
6717	Jerusalem thorn
6730	Sycamore
6740	Cottonwood
6741	Balsam popular
6745	Plains cottonwood
6746	Quaking aspen
6747	Black cottonwood
6748	Fremont cottonwood
6749	Narrowleaf cottonwood
6755	Mesquite
6756	Western honey mesquite
6757	Velvet mesquite
6758	Screwbean mesquite
6760	Cherry; peach; plum
6768	Bitter cherry (<i>emarginata</i>)
6800	Oak (deciduous)
6801	California live oak
6803	Arizona white oak
6805	Canyon live oak
6807	Blue oak
6810	Emery oak
6811	Engelmann oak

Code	Host Forest Type
6814	Gambel oak
6815	Oregon white oak
6818	California black oak
6821	California white oak
6826	Chinkapin oak
6829	Mexican blue oak
6839	Interior live oak
6843	Silverleaf oak
6850	Oak (evergreen)
6902	New Mexico locust
6920	Willow
6924	Scouler willow
6981	California-willow
6990	Arizona ironwood; tesota
6997	Russian-olive
7000	MISCELLANEOUS WESTERN SOFTWOODS
7041	Port-Orford-cedar
7042	Alaska-cedar
7050	Cypress spp.
7052	Baker cypress
7053	Tecate cypress
7054	Monterey cypress
7055	Sargent cypress
7057	Juniper spp.
7058	Pinchot juniper
7059	Redberry juniper
7062	California juniper
7064	Western juniper
7065	Utah juniper
7066	Rocky Mountain juniper
7069	Oneseed juniper
7071	Tamarack
7072	Subalpine larch
7073	Western larch
7081	Incense-cedar
7101	Whitebark pine

Code	Host Forest Type
7102	Bristlecone pine
7103	Knobcone pine
7104	Foxtail pine
7106	Common pinyon
7109	Coulter pine
7113	Limber pine
7120	Bishop pine
7124	Montery pine
7127	Grey pine
7133	Singleleaf pinyon
7134	Border pinyon
7137	Washoe pine
7138	Four-leaved pine
7139	Torrey pine
7140	Mexican pinyon pine
7141	Pinyon-Juniper
7231	Pacific yew
7251	California Torreya
7991	Saltcedar
9000	MIXED CONIFERS
9001	Mixed conifers, California
9999	Unknown *